INPUT®

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 (201) 801-0050
Fax (201) 801-0441

FAX TRANSMITTAL FORM

Date: July 30

Confidential: Y / N
Urgent: (Y) / N

To: Name: Brian Pawlus

Tel./Location: 312-507-7848

Co.: Andersen Consulting

Page: 1 of 2

Fax No: 507-1043/1048

File: Chron
Contact
Other:

From: Tom OFlaherty

Subject: Questionnaire Requested

This is a clean-up version, "Suitable for Framing"

Substance is the same, with note added at bottom if you want to add it to rpt.

SUPPLEMENTAL QUESTIONNAIRE

Thank you very much for agreeing to answer a followup question involving how you and your firm would evaluate packages which were developed using different approaches.

Please refer to the diagram titled, "Evaluation of UNIX-Based Manufacturing Packages".

1a. What would your preference be between the six different packages shown in the diagram? Please rank them from 1 to 6, with 1 being your first choice. It's fine if you want to give two or more choices the same rank (that is, award ties).

Package	Rank
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

1b. Please briefly explain why you gave them these rankings?

_____

_____

_____

[ASK THE FOLLOWING IF APPROPRIATE:]

1c. I notice that you gave a different rank to
[name either or both, depending on rankings]

- A and B
- C and D

What, if anything, would have to be changed in order for you to give that pair **[those pairs]** the same ranking?

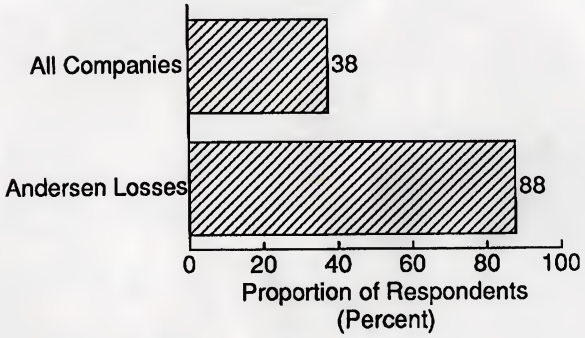
_____

_____

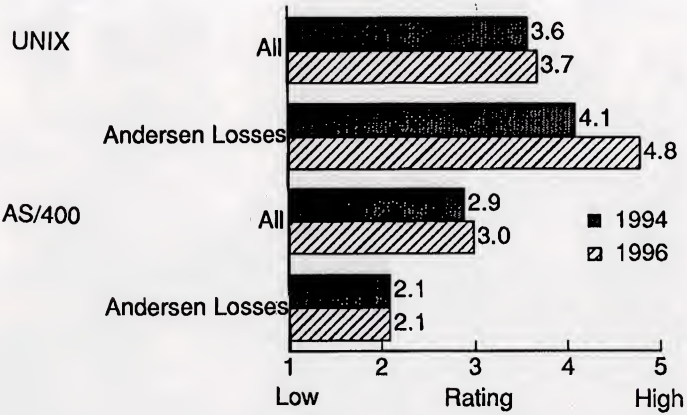
_____

[Note: The diagram referred to is that shown in Exhibit 1 of the report.]

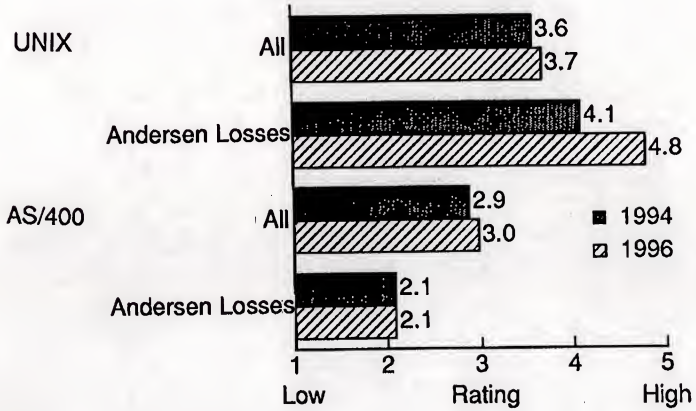
UNIX Environments Being Considered for New Application



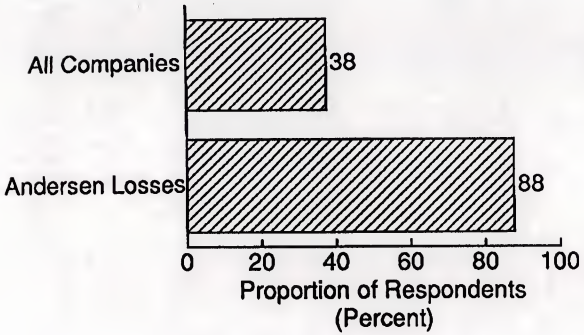
Ratings of Operating Environments: 1994 & 1996



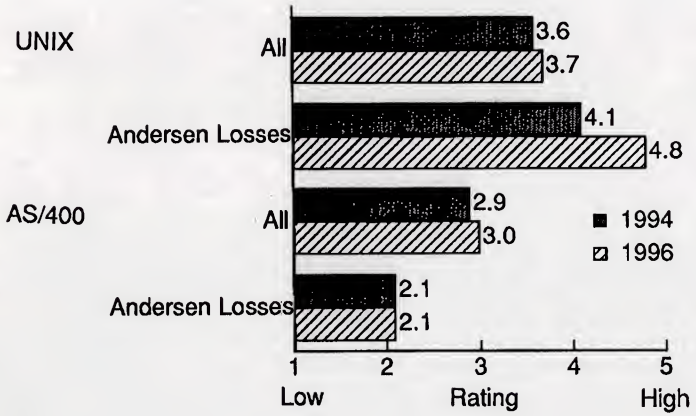
Ratings of Operating Environments: 1994 & 1996



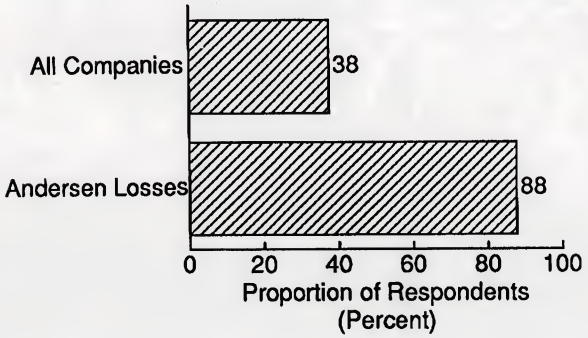
UNIX Environments Being Considered for New Application



Ratings of Operating Environments: 1994 & 1996



UNIX Environments Being Considered for New Application



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FAX TRANSMITTAL FORM

Date: Aug 30

Confidential: Y/N
Urgent: Y/N

To: Name: Jesus Renee

Tel./Location:

Co.:

Fax No:

Page: 1 of 1

File: Chron
Contact
Other:

From: TA

Subject: YAG Add-on

Please back out the YAG add-on.

What had initially been accepted turned out not to be & it was too late to redo it

Which add-on? $4000 This one
or
$4500

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FAX TRANSMITTAL FORM

Date: 7/30

Confidential: Y / N
Urgent: Y / N

To: Name: Renee

Tel./Location:

Co.:

Page: 1 of 1

Fax No:

File: Chron
Contact
Other:

From:

Subject: YAG - add ons

Ok to bill

	Fee	Expense	Total
Add-on 1	4,000	inboarded	4,000
Add-on 2	4,500	inboarded	$4,500

Descriptions 1 = Analysis of characteristics of Andersen Lossen

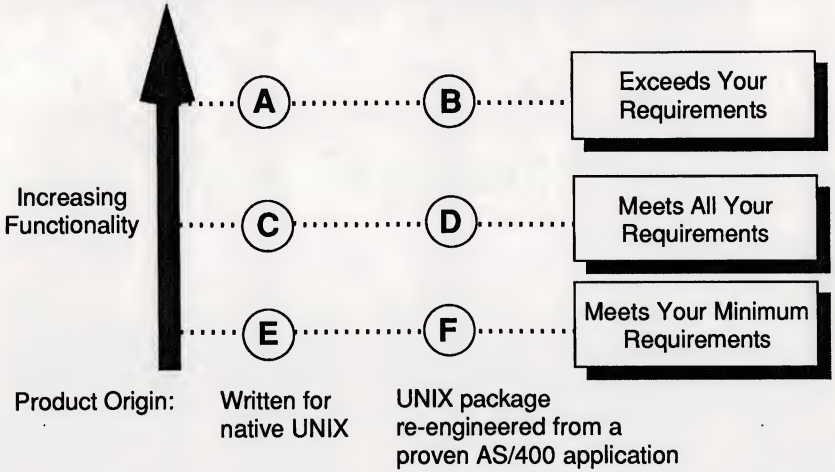
2 = Acceptability of Native UNIX & Re-engineered AS/400 Packages

Original YAG = 823,000 (+ expenses)

Exhibit 1

Evaluation of UNIX-Based Manufacturing Packages

[Circled letters refer to different hypothetical software packages]



- Assumes that price, maintainability, and technical factors (e.g., response time, reliability) are equivalent for native UNIX and re-engineered packages)

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FAX TRANSMITTAL FORM

Date: 5/21

To: Name: RF

Tel./Location:

Co.:

Fax No:

From:

Subject:

Confidential: Y / N
Urgent: Y / N

Page: 1 of 8

File: Chron
Contact
Other:

Please invoice Brian Pawlus for ½ of the professional fee. I guess Tom will leave OIF on Monday for this (with project code), but this gentleman would like an invoice faxed ASAP. Can you do today or must this wait until Monday?

Your friend,
Joanne B.

Have a great weekend!

ADM 341/05 1/92

INPUT

AUTHORIZATION

To authorize the project as specified, please sign and return one copy of this proposal along with the initial fee. Upon acceptance by INPUT, a countersigned copy of the proposal will be returned to Andersen.

AUTHORIZED BY:	ACCEPTED BY:
Andersen Consulting	**INPUT**
Brian Paslay	
Name	Name
PROGRAM MANAGER	
Title	Title
5/21/93	
Date	Date

INPUT®

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 (201) 801-0050
Fax (201) 801-0441

FAX TRANSMITTAL FORM

Date: 7/9

Confidential: Y / N
Urgent: (Y) N

To: Name: Renee

Tel./Location:

Co.:

Page: 1 of ____

Fax No:

File: Chron
Contact
Other:

From: TDP

Subject: YA6 Invoice

I am giving presentation Mon in Chicago & they want final invoice then. Since you're out today, could you fax an invoice to Brain Pawlus, Andersen 312-507-1043, by 10[D] if possible, otherwise by ~~noon~~ 1 pm

Remaining Fee $11,500

Expenses

Anything already collected ____

149 U.S.D tel internals @ $ ____ = ____

Approx 30 hrs NJ prod time @ $

12 Mt View graphics

TDP travel 7/12

- $740 air
- 100 other

$840

Anything else ?? ____

INPUT

Proposal

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE U.S/CANADA MARKET

Submitted to

ANDERSEN CONSULTING

May 11, 1993

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

INPUT

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE U.S/CANADA MARKET

I. Background

Andersen Consulting is considering porting MACPAC for the AS/400 to the HP/Informix Unix platform. Andersen wants to understand buyer reception to such a product offering. INPUT has been invited to submit this proposal describing the research to be undertaken to gauge buyer receptivity.

II. Scope

This study will assess the U.S./Canada market and address the issues below. (Similar studies will assess the European and Asia/Pacific markets and will be proposed separately.)

- Within the discrete manufacturing sector, how likely are companies to replace their manufacturing, financial and distribution applications in the next three years? How much of the replacement will be packaged software?
- What will be the more important acquisition criteria used to select packaged software? (This includes, but is not limited to, cost, ease of use, features, portability, and vendor reputation.)
- What are customers' current plans for choosing products from specific vendors?
- How important is the technical environment to buyers in general? (This includes hardware platform, operating system, DBMS.) What are the perceived strengths and weaknesses of the UNIX platform as seen by prospective customers? How does the HP/Informix combination compare to other hardware/DBMS combinations?

- How does the market generally view porting manufacturing applications to the UNIX platform (as opposed to being written from scratch)? What are seen as the strengths and weaknesses of porting? How does the market view the AS/400 platform as a platform of origin?

- How large is the likely market in the U.S. for packaged software in the discrete manufacturing sector over the next three years? What is the likely share for Unix-based products?

- To what extent are the preceding "Scope" points affected by company size? (Grouped, for example, into $50-100 million, $100 million - $1 billion, over $1 billion)

- To what extent are there regional variations in the U.S. (by Andersen's four regions)?

III. Conduct of the Work

INPUT proposes to answer the questions under "Scope" by conducting 125 structured telephone interviews among U.S. and Canadian discrete manufacturing firms. This sample size will allow inferences to be made in sub-segments based on geography and company size.

INPUT will prepare a draft questionnaire which will be reviewed with Andersen.

Respondents will not be informed of Andersen's sponsorship of the study. Company names of respondents will not be associated with detailed findings; Andersen will be supplied a list of companies interviewed and a distribution of types of titles of respondents. Respondents will be qualified as being in the recommendation/approval process for their company's manufacturing systems planning. As an incentive to supply information, respondents will be supplied a "sanitized" summary of the study, which will be reviewed with Andersen before release.

Questionnaire data will be reviewed for completeness and accuracy and entered into an analysis database, probably using the ABSURV analysis package; open-ended questions will be coded wherever possible. If Andersen desires, a copy of the database and/or completed questionnaires will be made available to Andersen, with respondent identifiers removed.

INPUT will prepare a written report as well as presentation materials (overhead transparency format) containing the study's findings. (INPUT and Andersen will agree on the sequence in which these materials will be supplied.)

IV. Schedule

The study will be conducted according to the following schedule:

Week	Activity
1	Draft and review questionnaire; receive Andersen target SIC codes, company size groups and Andersen geographic areas.
2	Conduct test interviews
3-4	Conduct remaining interviews
5	Data review and database input
6	Analyze results and prepare findings
7	Prepare and make presentation in Chicago
8	Prepare written report [Note: Activities in weeks 7 and 8 can be reversed.]

V. Fee

INPUT's professional fee for this study will be $23,000. One half of this amount ($11,500) is due and payable at the time of project authorization. The remainder plus expenses is due at the submission of the final report. Out-of-pocket expenses (primarily travel, production and telephone charges) are not expected to exceed $3,000.

AUTHORIZATION

To authorize the project as specified, please sign and return one copy of this proposal along with the initial fee. Upon acceptance by INPUT, a countersigned copy of the proposal will be returned to Andersen.

AUTHORIZED BY:	ACCEPTED BY:
Andersen Consulting	**INPUT**
Name _____	Name _____
Title _____	Title _____
Date _____	Date _____

Report

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE U.S/CANADA MARKET

Submitted to

ANDERSEN CONSULTING

June 12, 1993

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

I. BACKGROUND AND METHODOLOGY

A. Background

Andersen Consulting is considering porting MACPAC for the AS/400 to the HP/Informix platform. Andersen wishes to understand buyer reception to such a product offering. INPUT was commissioned to conduct market research in the U.S./Canada market to gauge likely buyer receptivity. The proposed research consisted of 125 structured interviews with discrete manufacturing firms in the U.S. and Canada.

B. Methodology

INPUT prepared a draft questionnaire which was reviewed by Andersen. (A copy of the questionnaire is in Appendix A.)

Respondents were qualified and categorized in the following ways:

- According to Andersen's prioritization of manufacturing subsectors. (See Appendix B, which shows SIC codes classified into "high". "medium" and "low".)
- By company or operating unit size.
- Whether a manufacturing application was planned to be replaced in the next three years. [If no replacement was planned, the company was excluded from the rest of the study.]
- Whether packaged software would be considered by those planning a replacement. [If packaged software would not be considered, then the company would be excluded from the study.]
- Respondents should be part of the recommendation/approval process for selecting new applications.

As it turned out almost 90% of all companies contacted were planning to replace at least one manufacturing-related application and would be considering packaged software (Exhibit I-1). INPUT considers this to be a significant finding and shows an acceleration in replacement compared to studies conducted in 1992. After these exclusions, the remaining sample produced 133 completed interviews.

Respondents were furthered qualified by their involvement in manufacturing applications. As shown in Exhibit I-2, respondents were heavily involved in the recommendation and approval process. Respondents were classified by both their title level and their organizational area (Exhibit I-3).

- About half the respondents were from the IS area, most of them in executive positions.
- Applications specialists, either in a functional area or in an applications, unit accounted for the remainder of the interviewees.
- This mix is consistent with other INPUT studies which have shown a steady migration, or sharing, or responsibilities between the traditional IS unit, end user areas and new organizational structures which address application systems needs.

Respondents were quite forthcoming and frank and answered questions as completely as they could.

The questionnaire was a mixture of rating questions and open-ended questions. Where there were clusters of answers in an open-ended question, these were grouped and classified. In other cases, where the number of responses were too small or responses were quite scattered, extracts of the actual replies are presented.

The data which follows shows results for the entire sample of respondents. The sample was large enough so that the following sub-samples were also analyzed.

- The effects of the size of company on these results was assessed by analyzing the 30 companies in the sample whose revenues were over $500 million.
- The effects of Andersen priority segments was analyzed by analyzing 63 companies in Andersen's "high" group.

In neither case was the data appreciably different from the sample as a whole. Given the focus of this study, INPUT finds this lack of difference reasonable.

II. APPLICATIONS REPLACEMENT AND MARKET SIZE

A. Replacement Plans

Near term replacement plans are a critical factor for Andersen's plans. Exhibit II-1 shows a high degree of replacement planned in all major areas. Financial applications show the highest replacement rate.

Respondents were asked to assign probabilities to replacement.

- Probability of replacement is quite high.
- These percentages exclude those who could not give a probability; therefore, the replacement rates may even be conservative.

These replacement plans are driven by a variety of factors, many of them mutually reinforcing. Exhibit II-2 has classified these reasons. INPUT is struck by the urgency of many of these motivating factors.

A very large percent of respondents are looking to use packaged software as the replacement (Exhibit II-3).

- Virtually all firms are considering packaged software; the figures in Exhibit II-3 are for firms that give packaged software use a probability of 75% or more.
- Almost half the firms surveyed are in fact evaluating one or more packages now (Exhibit II-4).
- Exhibit II-5 is a list of applications packages which firms were willing or able to cite as currently under evaluation. Note the wide array of vendors; no vendor appears to have a lock on this market.

Exhibit II-6 shows the hardware/software operating environments being considered for new applications (in many cases there is more than one under consideration).

- The UNIX environment is being considered more than any other single environment.
- The proprietary environments as a group are being looked at by about half the firms interviewed.
- Note that the AS/400 was the second most frequently cited environment.
- INPUT believes that the proprietary platforms are more likely to be rejected in the evaluation process.
- On the other hand, Windows NT and its successors are likely to be much more of a factor in the medium term, i.e., further out than three years.

Overall, INPUT believes that UNIX-based applications will prove to be quite acceptable in this market.

Exhibit II-7 shows INPUT's current forecast for packaged applications software in discrete manufacturing: A current market of over $2 billion, growing to twice that in five years.

- These figures (produced in 1992) may in fact underestimate growth somewhat, given changes now going on in this market.

- The midrange/minicomputer segment is beginning to blend into the Workstation/PC segment. For the purposes of this project, INPUT would combine these two categories for sizing purposes.

Overall, INPUT believes the UNIX proportion of the overall market to be in the 40-50% range over the next three years.

- Further out, much will depend on both the real and apparent success of NT (and OS/2, to a degree).

- The result is a window of opportunity in the short term and the potential for greatly increased competition in the longer term. Therefore, INPUT believes that early entry by Andersen into the UNIX market will be a key success factor.

III. PACKAGE SELECTION CRITERIA

Functionality and ease of use are important (or very important) to virtually every company (Exhibit III-1).

- Vendor reputation and installation support are important to about three-quarters of companies (global presence, on the other hand is not very important). Cost is of medium importance.

- Technology factors (client/server and portability) are the least important factors on the list.

The survey looked at these issues another way, by asking respondents what advice they would give to vendors on what should be included in the next generation of software. These results are categorized in Exhibit III-2.

- The general category of a better technical environment and associated efficiency and performance was cited by one-third of respondents. Details are shown in Exhibit III-3.

- Improved user friendliness was cited by a quarter of respondents.

- Improved functionality was also cited by a quarter of respondents. However, there was no particular agreement on which functions were important (details in Exhibit III-4).

- The fact that functional needs can vary so much was the reason, INPUT believes, for 20% of respondents citing the need for more flexible software.

The actual software package selection process is almost always a joint effort in the companies interviewed, with representatives from both IS and the functional area(s) involved. In many organizations, the functional unit will have more influence, but this is a very organization-specific factor.

IV. ASSESSMENTS OF OPERATING ENVIRONMENTS

A. General Assessments of Operating Environments

Respondents were asked to rate five of the principal operating environments (Exhibit IV-1).

- UNIX received the highest ratings, OS/2 and MVS the lowest.
- The low ratings are quite low for this kind of survey; the UNIX ratings are acceptable, but do not indicate an impregnable position.
- For the most part, there was little difference between ratings for 1994 and 1996, except for Windows NT. There appears to be a predisposition to see good things in the future for NT. If NT's performance lives up to its promise, then NT could become a real competitor.

In addition to the single point ratings above, respondents were also asked to give what they saw as the strengths and weaknesses of these operating environments. The comments for each operating environment are in Exhibits IV-2 through IV-11.

- These strengths and weaknesses, while covering a lot of ground, do not contain any real surprises.
- Exhibit IV-12 provides an unweighted summary of the points made.
- Again, INPUT draws attention to Windows NT: The main weakness is that it is new.

Exhibit IV-13 provides an "index" of the strengths and weaknesses for each environment by counting the number of items mentioned as a strength or weakness and dividing by the total number of respondents; this takes into account of multiple reasons given by some respondents.

- This indicates that even UNIX is seen to have almost as many weaknesses as strengths.

B. Suitability of Selected UNIX Platforms for Running Manufacturing Applications

In the preceding section, general environments were evaluated. Respondents were also asked about the suitability of specific UNIX hardware and DBMS environments for running manufacturing applications.

- HP was rated as the most suitable hardware platform (Exhibit IV-14). Sun and IBM were reasonably close; DEC's Alpha was further behind, probably because of its recent release.

- DBMS products were clustered fairly tightly, with Informix perhaps behind the others (Exhibit IV-15).

Respondents are asked to cite particular hardware/DBMS combinations that they "believed would be particularly attractive". Exhibit IV-16 lays out these volunteered responses.

- In some case multiple combinations were provided.

- In other cases, respondents would name only a hardware or only a DBMS platform.

- In hardware, HP and IBM were cited most overall.

- Oracle and Sybase were the most cited among the DBMSs.

- No particular combinations were dominant; some combinations were not cited at all.

- The Informix/HP pair was only cited twice. Informix was among the DBMSs cited least. [Note: This question was asked after and as a follow on to the rating question, so Informix was positioned as well as Oracle, Progress of Sybase for recall.]

It is INPUT's belief that the hardware part of the hardware/DBMS pairing will be more important in the marketplace. Consequently, HP's higher rating is more important than Informix's lower rating.

V. UNIX PORTING ISSUES

One of the sections of the interview focussed on respondents' attitudes toward re-engineering/porting of an application to UNIX that was originally written for another operating system. There were three related sets of questions asked:

- The general advantages and disadvantages in going from a non-UNIX to a UNIX environment.
- The specific advantages and disadvantages in going from the AS/400 to UNIX.
- The advantages and disadvantages in going from MS-DOS to UNIX [This was a "control" question.]

Exhibits V-1 to V-6 provide the detail on the comments made for advantages and disadvantages.

- Overall, the advantages seen were an increased probability that an application would work and contain the necessary functions; also, that time and expense would be reduced.
- Disadvantages include a general doubt that such conversions can be effective along with the associated questions as to
  - Whether all of the original functionality will be carried over onto the new platform.
  - Whether full advantage will be taken of UNIX's capabilities.

Relatively fewer advantages were seen and relatively more doubts were expressed as specific originating platforms (AS/400 and MS-DOS) were examined.

- Less, of course, was known about the specifics of MS-DOS or AS/400 porting.
- There appeared to be an underlying belief that dissimilarities in architecture would cause problems.

INPUT does not believe that these findings are necessarily causes for alarm. However, they should be taken into account when preparing the product for market, for example,

- Certain technical objections can be dealt with in advance (e.g., feature transference and UNIX efficiency).
- It might prove advantageous, for example, to point to the past use of the functional components without stressing the platform origins.
- Further research on the reaction of initial prospects may also be in order.

Exhibit I-1

Interview Qualification Process

Category	Number of Interviews	%
No application replacement planned in next three years	4	3
Replacement(s) planned, but packaged software won't be considered	12	8
Target Respondent: Considering package(s) for replacement	133	89
		100

Exhibit I-2

Respondents' Areas of Responsibility

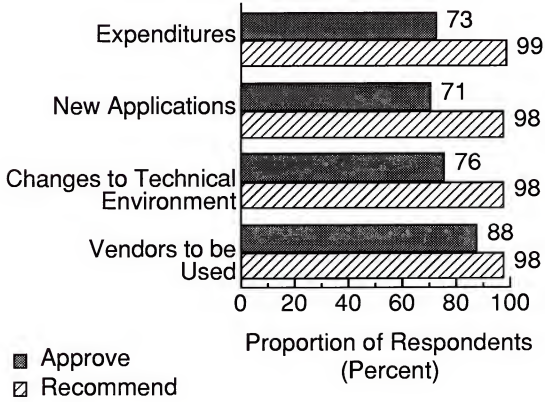


Exhibit I-3

Respondent Titles (Classified)

	Organizational Area			
Title/Level	General IS	Appli-cations	Functional User	Total
Unit Head	57	0	12	69
Middle Managers	10	32	9	51
Analysts/ Specialists	0	13	0	13
TOTAL	67	45	21	133

Exhibit IV-8

Windows NT Strengths

- Network for users
- Great option for high power area
- Suitable for single station use
- 32 bit processing operating system
- Hopes for future PC capabilities
- Multi-task feature
- Much larger sphere of software
- Will certainly consider
- Cute
- Ascending
- Looking at right now
- Good PC environment
- Good chance
- Microsoft name
- Plans to use
- Cost
- Client/server
- Good token ring
- Hope to make use in network and client/server
- Currently evaluating
- Dependability
- Ease of use
- Probably best option
- Provides ease of use
- Strong
- Good but new
- Low cost
- Being looked at
- Looks to be a good thing
- Represents a strong case
- Do well to meet end users and client/server requirements
- May go with this
- Microsoft
- Powerful
- Microsoft
- When it is less new it will be good
- Works well with company engineering systems
- Distribution capabilities
- Easy to use
- Speed
- Vendor reputation
- Openness
- Interfacing
- Multifaceted
- Multi-processing
- Client/server
- Work on wide range of platforms

Exhibit IV-9

Windows NT Weaknesses

- Not available
- Not needed
- Not stable enough to use as client/server
- Too new
- Untried
- Too many operators
- Too recent
- Not an issue
- Too new
- Too much hardware
- Yet to be proven
- Too new
- Doesn't see it being a useful product
- Not available
- Not proven yet
- Not enough information
- Waiting to see maturity
- Don't know much yet
- No plans for a year
- Takes too much administration
- No PC applications would apply
- Don't know to much about it yet
- Too soon to comment on
- Too new to say
- Not transaction driven
- Unavailable
- Too early to say
- New on market
- Too new
- Not out yet
- Too new
- Not enough people know about it
- Too new
- Requires a lot of hardware
- Too new
- Still unproven
- Don't know
- Expensive and too large for PC environment
- Not proven yet
- No applications
- Untested

Exhibit IV-10

MVS Strengths

- Handles applications without complaints
- Very reliable
- Good
- Reliability
- Data security
- Multi-user
- High functionality
- Large selection
- Support
- Does the job
- Fine
- Very satisfied
- ESA on host mainframe
- High transaction rate
- Great
- Mainframe
- File server
- Greater selection
- Good
- Mainframe
- Stable operating environment
- One point of support
- Proven
- Versatility
- Strong base security
- Handles heavy loads

Exhibit IV-11

MVS Weaknesses

- Complex and too costly
- Dying system
- Proprietary
- Not in step with company movement
- Not user friendly
- Too big and too expensive
- Would never consider using
- Too expensive
- Too old
- Too expensive
- Diminishing
- Wouldn't consider
- Antiquated
- Wouldn't consider M/F
- Not an MVS shop
- Poor solution
- Will probably die
- Applications not written to platform
- Not flexible
- Proprietary
- Proprietary
- Cost
- Cost
- Impractical
- No use for mainframe
- No IBM mainframes wanted
- Not our strategy at this point
- Weak
- High cost
- Costly
- Difficult to maintain support
- Proprietary
- Slow development requirements
- Negative for company needs
- Too costly
- Too costly
- Not user friendly
- Very dependent on mainframe
- Too big
- Too big

Exhibit IV-11 (Cont.)

- Not good for client/server
- Too cumbersome
- Availability
- Too expensive
- Cost
- Cost
- Proprietary
- Expensive
- Mainframe is not compatible
- Overkill and not worth building a new infrastructure
- Expensive
- Limited flexibility
- Too big
- Too big for our operations
- Hardware and software are too costly
- Don't know
- Too big
- High cost

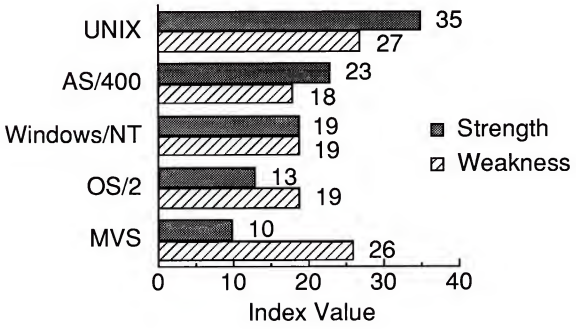
Exhibit IV-12

Operating Environment Strengths and Weaknesses: Summary

Environment	Strengths	Weaknesses
UNIX use	• Portable/open • Wide use • Inexpensive hardware	• Immature • Not standard • Complexity/ease of
AS/400	• Installed base • Ease of use • IBM • Software packages	• Proprietary • Cost
OS/2	• Technology • Portable	• Proprietary • Market acceptance
Windows NT	• Microsoft • Technology • Image	• Untried
MVS	• Reliable • Power	• Cost/size • Obsolete • Proprietary

Exhibit IV-13

Index of Strengths and Weaknesses for Operating Environments



Note: Index Value = Total mentions/number of respondents (133)

Exhibit IV-14

Suitability of Selected Hardware Products for Running Manufacturing Applications

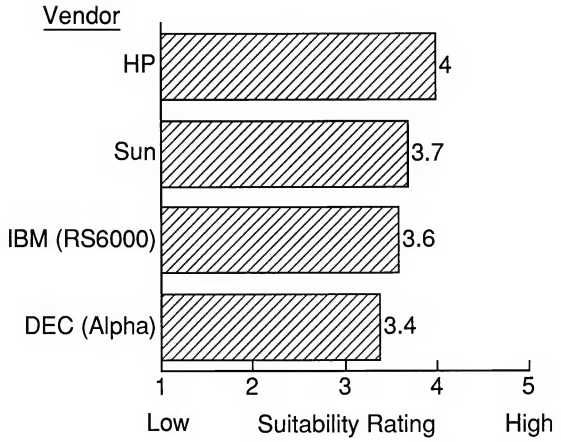


Exhibit IV-15

Suitability of Selected DBMS Products for Running Manufacturing Applications

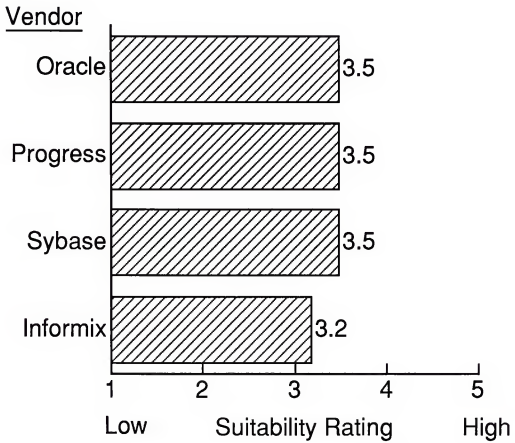


Exhibit IV-16

UNIX Hardware/DBMS Cited as "Especially Attractive"

(Matrix intersections show combinations cited.)

DBMS	DEC	HP	IBM	Sun	Other *	DBMS Only Named	Total
Informix		2	2	2			6
Oracle	4	6	5	5	(a) 2	4	26
Progress		2	2	1		4	9
Sybase	3	7	5	4		4	23
Ingres*	2		2			2	6
Supra*						2	2
HW only named	4	8	7	4	(b) 3	-	26
TOTAL	13	25	23	16	5	16	98

* Products volunteered
(a) = OS/2, Sequent
(b) = Data General, Tandem, Incube

Exhibit V-1

Advantages of Re-engineering an Application to Run Under UNIX

- Good idea
- Scale ability
- Portability
- Networking
- Runs on more current and less costly hardware
- More diverse functions for smaller networks
- Friendly environment for client/server better platforms to be on
- If mature product needs viable applications
- operation system
- Better price
- If very unique application
- Would like to look into
- Multi-user environment
- Easy to use
- If supports UNIX and DOS
- Portability
- Business environments
- Looking at UNIX
- A more open system
- High compatibility enhancement
- Programmer productivity
- Good for some applications
- Way to leapfrog to gain functions of environment
- To use
- Speed of porting
- Portability to other hardware once under UNIX
- Open systems
- Gain advantage of open system multi tasking
- Networking
- Open systems
- Scalablity
- Cheaper hardware
- Portability
- Portability
- Needs a solid cost analysis study
- Re-engineering to a versatile open environment
- Very versatile and users like it
- More approaches

Exhibit V-1 (Cont.)

- Open system
- Better portability
- System maturity
- Downsizing
- Less expensive to operate
- Good for database
- Improves documentation
- Improve cost/time factor to profit from new environment
- Provides direct interface runs with other system and applications in INIX environment
- Users familiar with UNIX platform
- Portability
- Reduced cost
- Run multiple sets of environments
- For a particular need or function
- Opportunity to take advantage of new technology
- Portability
- Cost effective
- Portability and independent Hardware
- Make everything more flexible
- Could size hardware to fit needs better
- Transportability and ability to interface
- Programs easily portable to run on many different platforms
- Can do what otherwise couldn't be developed
- Stay with leading tech
- Multi-platform availability
- Keeping software investment
- Flexibility
- Easy to use
- Lower cost
- Will run on almost any platform
- Multi platform capability
- Flexibility after porting application
- More platforms available

Exhibit V-2

Disadvantages of Re-engineering an Application to Run Under UNIX

- Will application be fully functional
- Expensive
- Impractical
- No great benefit
- Not stable
- No advantage
- Complexities
- Too big and too costly
- Would not Accept
- No advantage
- No advantage
- But if the mainframe is not in use the rewriting would not be cost effective
- Many
- Not user friendly
- No advantage
- Need to build software to meet particular needs
- Cost and burden of other system requirements
- No advantage
- Hardware and software issues
- Too much trouble to do it
- Commitment is to UNIX solutions
- Cost
- Problems with rewrites
- Interfacing issues
- Dead issues windows NT would replace it
- No advantage
- Cost
- Conversion
- Cost
- Need to re-engineer
- Wants to see more data on compatibility
- Cost
- Doesn't give full support
- Age of application converted
- Cost to rewrite
- Too Costly
- Learning curve
- Vendor reliability and support
- people and procedure training

Exhibit V-2 (Cont.)

- Training of re-engineering
- Fully renewed system better
- No advantage
- A lot of work
- Cost to re-engineer
- Re-engineering
- New and unproven activity
- Interface activities
- Needs re-engineering
- Would take time to perfect
- Work and effort needed
- Relatively new technology don't have networking
- Too much time and effort in setup
- Too complex very difficult to do conversions
- Will it support business functions
- Cost and complexity
- No advantages
- The effort to do it
- Cost
- Time consumption
- Time to do it
- Cost or re-engineering
- Takes years of rewriting
- Probably not worth it
- Data interfaces connectivity and security
- Cost
- Return on investment low lack of stability
- Might not take full advantage of operating systems
- Too costly
- Cost
- Work development cost
- No advantage
- Calls for a lot of modification
- Expensive and time consuming
- No advantage
- Cost
- Won't happen
- Not easily portable
- May lose some of the design functionality of UNIX
- Cost to re-engineer

Exhibit V-3

Advantages in Porting from AS/400 to UNIX

- Portability in operating environment
- Open system
- Wider audience for applications
- Portability
- Commercial database access
- Cost of ownership
- Too early to say
- If cost is reduced
- Open systems
- Portability
- AS/400 is a good foundation
- Can run a good software package
- Multi-user
- Multi-task
- Portability and cost
- CAD and other engineering functions
- Flexibility
- All users are familiar with AS/400
- Downsizing or cost
- Good to standardize the UNIX environment
- Advantage for a large mainframe
- AS/400 is proprietary, good to make to open systems
- Take advantage of UNIX system
- UNIX already in use
- Cost effective
- UNIX has wider market
- Greater client connectivity
- Multi platform availability
- Want to do it
- Good for some applications
- UNIX more portable

Exhibit V-4

Disadvantages in Porting from AS/400 to UNIX

- Expense
- Loss of power
- No great benefit
- Not stable
- Cost
- No one-stop shopping
- Wouldn't do it
- No advantage
- Change in platform
- Too early to say
- No advantage
- Converting
- No advantage
- Isn't upgradable
- No advantage
- Commitment is to all UNIX solutions
- Have to change equipment
- No advantage
- No need foreseen
- Cost
- Not doing it
- UNIX not strategic
- No advantage
- Complexity
- Expense
- Cost to convert and train
- Cost environment
- Not sure of advantage
- No advantage
- Need to re-engineer
- Need for more powerful hardware
- Integration and interfacing
- Wouldn't consider it
- No comment
- No advantage
- So architecturally different
- Locked into IBM
- No advantage
- Rewriting
- Would not consider such a package
- A lot to modify
- Don't know enough
- No advantage
- No advantage
- Data loss and access
- Security
- Won't consider
- Not easy to port
- Not user friendly

Exhibit V-5

Advantages in Porting from MS-DOS to UNIX

- Multi user capability
- Better operating system
- Scalability
- Porting to a more robust operating system
- Portability
- Can work well
- Move from a PC based system to multiple users
- Emulation going on multi platform issue
- A positive return is expected
- Multi user environment
- Easy to use
- Gain a great deal of functionality
- Multi-tasking
- Efficiency and power
- Good if system is moving to client/server environment
- Don't care as long as it works
- Wide area network
- Multi user less expensive
- Open system
- Powerful workstations
- Servers more robust
- Open system
- Scalability
- Multi-tasking
- Advantage if running MS-DOS
- The system is DOS-based and is being downsized to client/server
- Have an MS-DOS base
- Networking capabilities
- Could be more sophisticated
- To standardize the UNIX environment
- Growth
- Good for single user
- Multi-user
- More functional
- More of a non-operational client/server environment
- Shouldn't be difficult
- Can go to different platforms
- Cost effective
- Multi-tasking

Exhibit V-5 (Cont.)

- Speed
- Improved performance
- Bigger memory and power
- Take into multi-user
- Multi-tasking universe
- Multi-platform availability
- Proven; tested; don't have to retrain people
- Better multi-processing
- Multi-tasking
- UNIX has a greater memory and speed
- Multi-user
- Multi-tasking

Exhibit V-6

Disadvantages in Porting from MS-DOS to UNIX

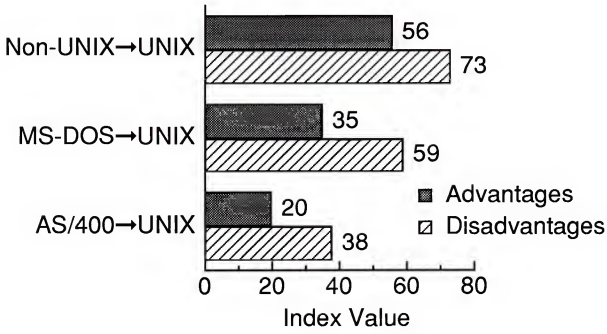
- No real advantage
- No great benefit
- Not stable
- Price
- More resource management
- Wouldn't do
- Cost
- Not suitable or cost effective for mini systems
- Many
- Converting
- No advantage
- Time
- No advantage
- No advantage
- Hardware platforms have the power
- Not sure this would go that way
- No advantage
- Commitment is to UNIX solutions
- Cost
- None
- Complexity
- No advantage
- No advantage
- Operating cost should be less
- Investment in UNIX must be justified
- No thoughts about changing MS-DOS
- No plans to move for three years
- Impractical and costly
- DOS will be around for a while
- No advantage
- Not appropriate
- Complexity of UNIX over DOS
- Need for new support
- Increased cost to run under UNIX
- Cost
- Cost

Exhibit V-6 (Cont.)

- Training
- Complexity
- No advantage
- No advantage
- Difficult to convert
- No need for cost to re-engineer
- More complex and expensive
- Cost
- Interface and Integrating activities
- Time required
- Not worth rewriting code
- MS-DOS is a single user
- No advantage
- Training of programmers and users
- People with MS-DOS are not familiar with UNIX
- Cost return on investment low
- Lack of stability
- No advantage
- Security
- Only if a single user environment
- No advantage
- A lot of modification
- Retraining
- Loss of experience
- No advantage
- Unfamiliar
- If they can talk to one another no reason to port it
- Not cost effective
- Not user friendly

Exhibit V-7

Index of Advantages & Disadvantages of Application Porting



Note: Index Value = Total mentions/number of respondents (133)

Exhibit II-1

Percent of Companies Planning to Replace Selected Applications in Next Three Years

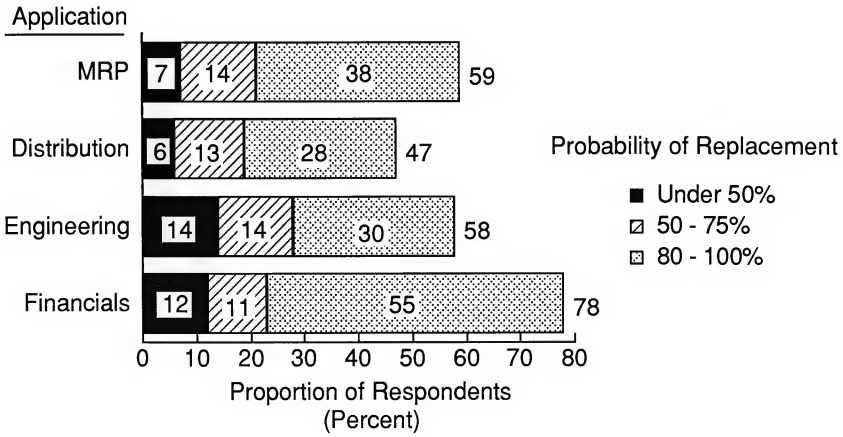


Exhibit II-2

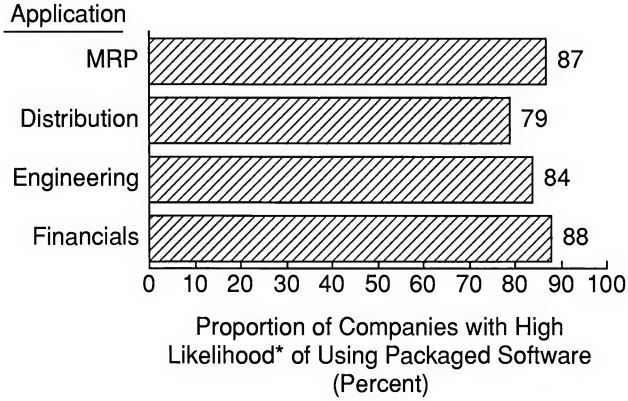
Reasons for Replacement

Percent of Companies Citing	Reasons
20-29%	· Obsolete software; need software upgrade · Improve technical environment · Improve functionality
10-19%	· Effects of changes to underlying business process · Downsizing/client-server · Reduce costs
Under 10%	· Move to open systems · Growth in underlying business · Other

Note: Open-ended answers were classified into the above categories.

Exhibit II-3

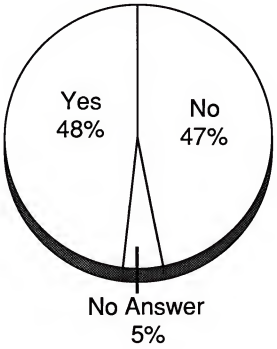
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-4

Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 133

Exhibit II-5

Specific Manufacturing-Related Software Packages Being Evaluated

(If named by more than one company, number of companies shown in parentheses)

Amax
Andersen (2)
ASK
Autocad
Avalon (5)
Cadkey
Cim300
Front Line
FSA
Global
J.D. Edwards
Lawson
Macola
Manman (3)
Mapics (2)
Marketrieve
Micromax
Oracle (3)
Pansophic
Platinum
Prism
QAD (3)
SAP (2)
Sherpa
SSA
Synapse
Unigraphics
XES (Xerox)

Exhibit II-6

Hardware/Operating Environments Now Being Considered for New Applications

Environments	Percent of Companies *
Proprietary Platforms · MVS 16% · AS/400 20% · VAX 13% · Other 9%	54
UNIX · RS6000 8% · HP 7% · Sun 4% · DEC ** · Not identified 20%	38
Intel · OS/2, Windows 5% · DOS 14%	19
Other · Windows NT 2% · Other 2%	5
Not specified	10

* Note: Totals more than 100% due to multiple evaluations.

** Less than 1%

Exhibit II-7

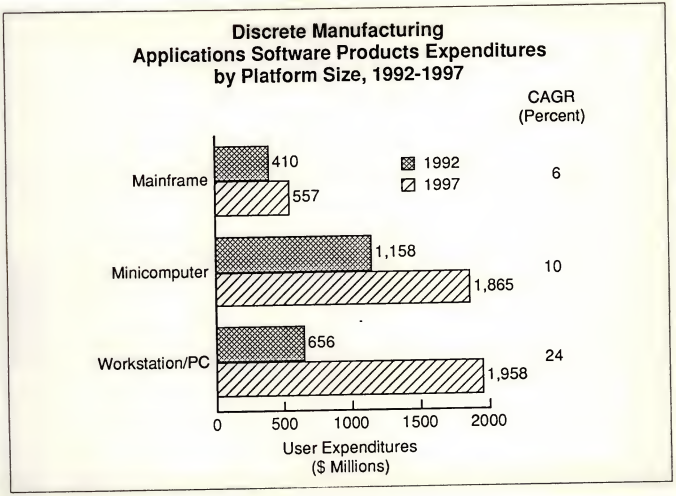
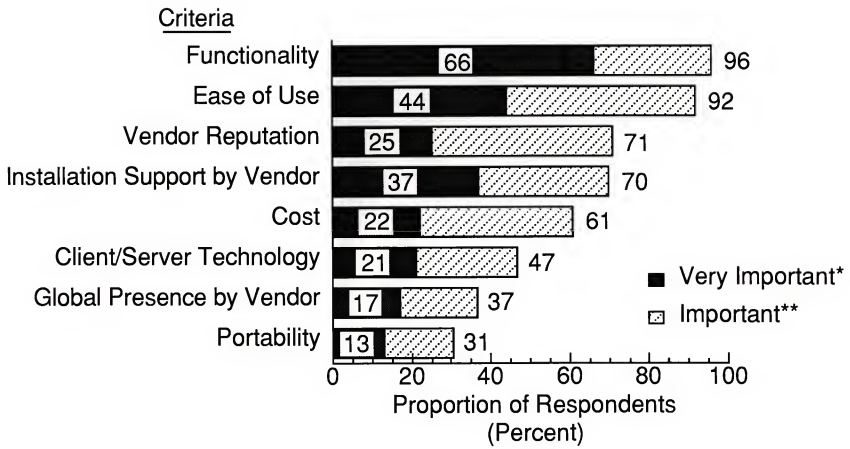

Discrete Manufacturing
Applications Software Products Expenditures
by Platform Size, 1992-1997
CAGR
(Percent)
Mainframe
410
557
1992
1997
6
Minicomputer
1,158
1,865
10
Workstation/PC
656
1,958
24
0
500
1000
1500
2000
User Expenditures
($ Millions)

Exhibit III-1

Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

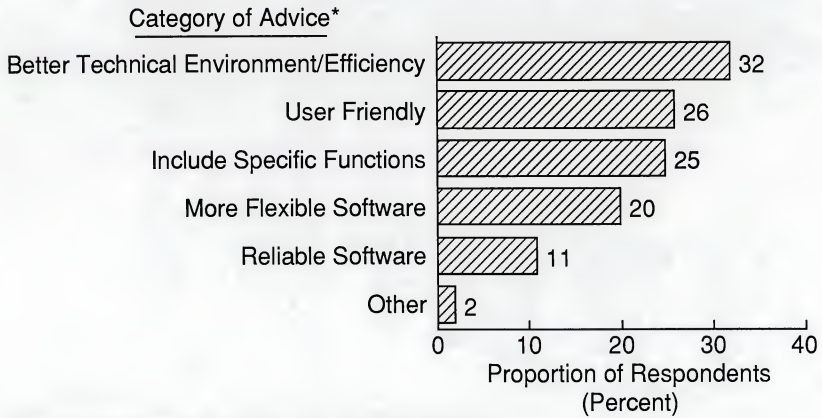
Exhibit III-3

Samples of Advice:
Technical Improvements, Efficiency

- Client/server technology
- Productivity
- Object oriented
- More capacity, less cost
- Cheaper
- Client/server
- Capabilities
- More portability
- Open and robust opportunity system
- Networking
- Portability
- Operating systems to be burned in machine
- UNIX platform
- Reduce cost
- Easy interfacing with other platforms
- Ability to integrate PCs with mainframe
- Cost effective
- Real time paperless environment
- Need software written for multi-platforms
- Full motion video
- CD rom
- Voice technology
- Logical data base that exists multiple platforms
- Networking management tools
- Handle large transaction volume
- Scalability
- Object oriented data base
- Portability
- Standardize protocols between systems
- Reduce the complexity of Lan administration
- Portability
- Affordability
- Strong clean client server
- Modular replacement
- Portability of applications

Exhibit III-2

Customer Advice on What the Next Generation of Manufacturing Software Should Include



* Open-ended responses were classified into these categories.
Note: Totals more than 100% due to multiple responses.

Exhibit III-4

Samples of Advice: Specific Functionality

- Electronic transfer
- EDI
- International
- Real time what if capabilities
- Access to user base
- JIT
- Automate more processes
- Ad hoc reporting
- Full function MRP II
- Engineering history prototype
- Know the industry and its needs
- A distributive and centralized planning cycle
- Handle batch manufacturing and continuous flow
- Support financial applications
- Information extaction
- Work in process interface
- Bar code data collection
- Fax interfacing
- Executive information system
- Graphic capabilities
- More industry specialization
- Shop floor control
- Order tracking
- More resource planning
- Package that can do everything

Exhibit IV-1

Ratings of Operating Environments: 1994 & 1996

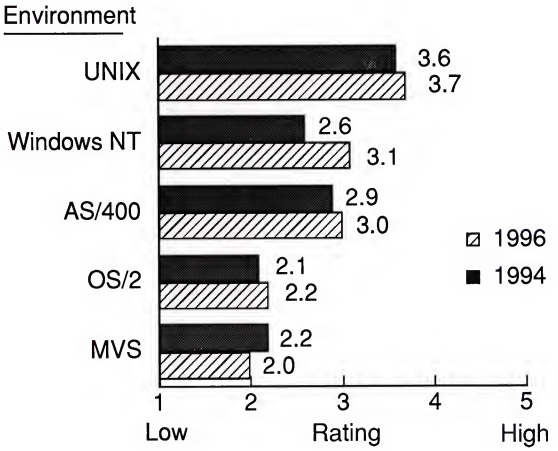


Exhibit IV-2

UNIX Strengths: Respondent Comments

- Portable
- Easy to use
- AIX Solution
- Already in use
- Interface with legacy
- Portability
- Cost of ownership
- Operating system for high end applications
- Strong performer
- Open connectivity
- Multi-tasking abilities
- Will be very popular
- Good system
- Use for engineering
- Multi-tasking
- More and more systems are running on it
- Very strong and flexible
- Open system
- Client/server environment
- Operating systems management tool
- Open systems
- Multi-user capability
- Very powerful
- Very strong open system
- Flexibility
- Has excellent points
- Compatible with right packages
- Hardware and support environment
- Best chance
- Selected by parent company
- Hardware is inexpensive
- Very functional
- Suitability and openness
- Next alternative
- Portability
- Definitely part of future
- No-problems
- Portability
- Client/server
- Very good
- Strong
- Likes it
- Everyone is pursuing this

Exhibit IV-2 (Cont.)

- Inexpensive
- Good when installed
- Very satisfactory
- Flexibility and data manipulation
- Handles all operations
- Platform
- Portability
- Very suitable for job
- About to install
- Meets all needs for software wide area network development
- Language capabilities
- Moving in that direction
- PC network
- Overall acceptance in open system
- New technology
- Availability of a functioning open system
- Distributed environment
- Standard operation system
- Best fit
- Standards
- Strong
- Reliable
- Standard operating system
- Open
- Good hardware
- Flexibility
- Worthwhile for staring out
- Openness
- Ability to run multi platforms
- Multi-tasking
- Multi-threading
- Portability
- Portability
- Performance
- Open system
- Ties in with engineering
- Multi platform usage
- Becoming a mainstream player
- Multi platform
- Multi processing
- Portability
- Good for RS6000 system
- Seems to be gaining more support and broader user database
- Multi platform engineering
- Engineering application
- Efficient
- Almost standard
- Multiple platforms

Exhibit IV-3

UNIX Weaknesses

- Functionality and reliability
- Too large and costly
- Not easy to use for end user
- DOS better for smaller software companies
- New operating system
- Not developed enough
- New systems lacking standards
- Not mature yet
- Too open
- Ease of use
- Doesn't match software
- Not as easy as it looks
- Not mature
- Not as user friendly with windows
- Very difficult
- Failure to standardize
- Interfacing
- Not as strong as they make it out to be
- Incomplete support
- Complexity
- Security
- Limited selection and features support
- More complicated
- Too much learning curve
- Complex
- Not much exposure
- No commercial application value
- Complex
- Not user friendly
- Expense to re-engineer
- Complexity
- New to company
- Development not as quick as PC technology
- Not so stable
- Too complex
- Not as open as people think
- Too open
- Not easy to use
- Somewhat archaic

Exhibit IV-3 (Cont.)

- Not user friendly
- Not flexible
- Robustness
- Software not flexible
- Cost
- Security
- Ease of use
- Too new
- Unsettled
- Cryptic
- Large operating system
- Retraining required
- System language
- Slow in computational ability
- Not user friendly
- Too small
- Getting away from it
- Not standard and complex
- Lack of ability to share data
- Not as much support
- Proprietary
- No need for business side
- No single UNIX

Exhibit IV-4

AS/400 Strengths

- Very stable
- Lot of software written for it
- Good flexibility
- Recently installed and works well
- Easy to work with
- IBM name
- Flexibility
- Conversion
- Optimal solution
- Has good UNIX Capability
- Would do fine
- Ease of use
- Installed
- Very mature
- Ease of use
- Reliable
- Good
- Allows us to be distributed
- Good for communications
- Backup and recovery
- Extremely good
- Reliable
- Database
- Ease of Integration to current manufacturing system
- Easy to use
- Current platforms
- Good rational database
- Performance
- Cost
- Interfacing data
- Some sites in Europe use this
- Used and have had good results
- Users like it
- Relational database
- Programmer productivity
- Good platform
- Fine
- Solid and reliable

Exhibit IV-4 (Cont.)

- Very easy to use
- Good platform
- Good reputation
- Platform is IBM
- Using it
- Operating systems
- Good choice
- User based
- A logical choice
- Flexible
- Already run on
- Excellent development environment
- Good mid-range
- Good use for them
- Good system
- Efficient
- Secure
- Multi-porting
- Software packages available
- Proven performance
- Have used for over ten years

Exhibit IV-5

AS/400 Weaknesses

- IBM proprietary and restrictive
- Too proprietary
- Too much equipment
- Communications
- Proprietary box
- Expensive
- Too expensive
- Dog
- Too much hardware
- Cost of operating system
- Cost of software
- Not standard system
- Not considering
- Memory problem
- Poor solution
- Too proprietary
- Not very much use
- Propriety system not as open as others
- Cost of hardware
- Proprietary
- It is not what IBM says
- Proprietary
- Becoming outdated
- Limited selection of full featured system
- Weak
- Expense to re-engineer
- Expense
- Proprietary
- Proprietary database
- Not as functionally quick
- Too costly
- Not easy for transition
- Not user friendly
- Not a good fit for company
- Cost
- Not useful with UNIX
- Unfamiliar
- MIPS
- Proprietary
- New equipment too expensive
- Not worth building a new infrastructure
- Not included in strategic planning
- Not portable

Exhibit IV-6

OS/2 Strengths

- Good operating system
- Solid
- Good system
- Seems to be reliable
- More functional and stronger products
- Good for PCs
- Portability
- Good product
- Used at a few locations
- A good system
- Compatibility
- High functionality
- Data sharing/collection
- Ease of use
- Cost
- Client/server
- Good results
- Better than Windows NT
- Portability
- Multi-tasking capabilities
- Looking into this
- IBM
- Multi-tasking
- Powerful PCs
- Good hardware
- Reputation
- Address capability
- Well known
- Compatible with DOS
- Multi-processing
- Client/server
- Works on small platforms

Exhibit IV-7

OS/2 Weaknesses

- IBM proprietary and restrictive
- Too proprietary
- Nothing there for them
- Too new
- Bugs with installation and support of peripherals
- Cost
- Take too much to run on PC
- Windows are capturing most of market
- Not enough software yet
- Dog
- Don't have hardware
- No interest
- Diminishing
- Not robust enough
- Not an IBM shop
- Needs more memory
- Not enough packages
- Not much use
- Not a big player
- Support
- Limited selection and features support
- Too much learning curve
- Too proprietary
- Weak
- Dying system
- Expense to re-engineer
- Proprietary
- Memory hog
- Not well known and not trusted
- Software not flexible
- Market acceptance
- Not as good as windows
- Unfamiliar
- Cost
- Consumption of memory
- Don't care for it
- Too little presence in market
- Not mature yet
- Not multi-processing environment they anted to use
- Vendor support
- Proprietary software
- Won't use again because of lack of database
- No application
- Doesn't work on large platforms

ORDER/INVOICE/FULFILLMENT

Acctg. ONLY

Inv. Comp.	By:	Date:	Client #	Order #	Inv. #	Multi-Invoicing of

CUSTOMER/INVOICE TO

ORIGINATOR (Signature) _____ DATE 7/16

APPROVALS

VP Sales/Res. _____ Date _____

Controller _____ Date _____

Company Anderson Consulting

Name Mr./Ms. Brian Pawlak

Position _____

Address _____

_____

City _____

Province _____

Phone 312-507-7848

CA Tax Rate _____

CT Tax 8% _____

Salutation _____

State _____

Zip _____

Country _____

Fax 312-507-1043

Tlx _____

Special instructions for invoicing, progress billing, or delayed payments, etc.

Bill immed

ORDER

Contract Year Beg. _____ End _____

☐ New Order (N1) ☐ Prior Yr (N3)
☐ Renewal (N2) ☐ Cancel

Invoice Type ☐ Fulfillment Only ☐ W/Order (OR) ☐ Monthly (MO) ☐ Quarterly (QT) ☐ Pending

Employee # Sold by: TAP 100%

Employee # Commission to: _____ %

CLIENT AUTH.

PO# _____

Attach all authorizing documents to white (contract) copy.

INPUT Contract ☐ Letter ☐ Verbal ☐

Fax

SHIP TO

Company _____

Name Mr./Ms. Steve

Position _____

Address _____

_____

City _____

Province _____

Salutation _____

State _____

Zip _____

Country _____

Phone _____

ITEM TYPE

- Subscription (SB)
- Custom (YC/ZC/KC)VC
- Multiclient (MC)
- Reports (RP)
- Copies (CP)
- Consult/Present (PR)
- Newsletter (NL)
- Reimbursed Costs (EX)
- Merger/Acq. (ME)
- Exec Overview (EO)
- Conf/Seminar (CN)

DETAIL

Indicate US, UK, FR, VA	Prod. ID/Year	Item Type Code	Item Description or Title	Quantity	Price	Shipped By	Date
US	YA6	YC	Follow on		$3,500		
			(no add'l expenses)				

Fulfillment to be completed in: ☐ Corporate ☐ London ☐ Virginia ☐ France ☐ Other _____

• White - Contract • Green - Fulfillment • Yellow - Invoice • Pink - Originator • Goldenrod - Sales Manager

M&S180 12/92

INPUT

ORDER/INVOICE/FULFILLMENT

Accg. ONLY

Inv. Comp.	By:	Date:	Client #	Order #	Inv. #	Multi-Invoicing of

CUSTOMER/INVOICE TO

ORIGINATOR (Signaure) _____ DATE 5/24/97

Company Andersen Consulting
Name Mr./Ms. Brian Pa
Position
Address 69 W Washington
City Chicago IL
Province
Phone 312-507-7848

CA Tax Rate
CT Tax 8%
Salutation
State IL
Zip 60602
Country
Fax 312-507-1043
Tlx

APPROVALS

VP Sales/Res. _____ Date
Controller _____ Date

ORDER

Special instructions for invoicing, progress billing, or delayed payments, etc.
Regular

CLIENT AUTH.

Contract Year Beg. _____
End _____

❑ New Order (N1) ❑ Prior Yr (N3)
❑ Renewal (N2) ❑ Cancel

Invoice Type ❑ Fulfillment Only ❑ W/Order (OR) ❑ Monthly (MO) ❑ Quarterly (QT) ❑ Pending

Employee # Sold by:	Employee # Commission to:
TA 100 %	____ %
____ %	____ %
____ %	____ %

PO# _____ INPUT Contract ❑ Letter ❑ Verbal ❑
Attach all authorizing documents to white (contract) copy.

SHIP TO

Company _____
Name Mr./Ms. Same
Position
Address
City

Province
Salutation
State
Zip
Country
Phone

ITEM TYPE

- Subscription (SB)
- Custom (YC/ZC/KC)VC
- Multiclient (MC)
- Reports (RP)
- Copies (CP)
- Consult/Present (PR)
- Newsletter (NL)
- Reimbursed Costs (EX)
- Merger/Acq. (ME)
- Exec Overview (EO)
- Conf/Seminar (CN)

DETAIL

Indicate US, UK, FR, VA	Prod. ID/Year	Item Type Code	Item Description or Title	Quantity	Price	Shipped By	Date
US	YA96	YC	Market for UNIX Manufacturing Software		23,000		
			$3,000 exp				

Fulfillment to be completed in: ❑ Corporate ❑ London ❑ Virginia ❑ France ❑ Other _____

• White - Contract • Green - Fulfillment • Yellow - Invoice • Pink - Originator • Goldenrod - Sales Manager

M&S180 11/90

INPUT

ORDER/INVOICE/FULFILLMENT

Acctg. ONLY

Inv. Comp.	By:	Date:	Client #	Order #	Inv. #	Multi-Invoicing of

CUSTOMER/INVOICE TO

ORIGINATOR (Signaure) _____ DATE June 11, 1993

APPROVALS

VP Sales/Res. _____ Date

Controller _____ Date

Company Andersen Consulting
Name Mr./Ms. Brian Pawlus
Position
Address
City Chicago
Province
Phone 312-507-7848

CA Tax Rate
CT Tax 8%
Salutation
State
Zip
Country
Fax 312 507 1043
Tlx

Special instructions for invoicing, progress billing, or delayed payments, etc.
bill at end with rest of YA6

ORDER

Contract Year Beg. _____
End _____

❑ New Order (N1) ❑ Prior Yr (N3)
❑ Renewal (N2) ❑ Cancel

Invoice Type ❑ Fulfillment Only ❑ W/Order (OR) ❑ Monthly (MO) ❑ Quarterly (QT) ❑ Pending

Employee # Sold by: _____ ___% _____ ___% _____ ___%

Employee # Commission to: _____ ___% _____ ___% _____ ___%

CLIENT AUTH.

PO# _____
Attach all authorizing documents to white (contract) copy.

INPUT Contract ❑ attached Letter ☒ Verbal ❑

SHIP TO

Company
Name Mr./Ms. Jake
Position
Address
City

Province
Salutation
State
Zip
Country
Phone

ITEM TYPE

- Subscription (SB)
- Custom (YC/ZC/KC)VC
- Multiclient (MC)
- Reports (RP)
- Copies (CP)
- Consult/Present (PR)
- Newsletter (NL)
- Reimbursed Costs (EX)
- Merger/Acq. (ME)
- Exec Overview (EO)
- Conf/Seminar (CN)

DETAIL

Indicate US, UK, FR, VA	Prod. ID/Year	Item Type Code	Item Description or Title	Quantity	Price	Shipped By	Date
US	YA6	YC	Add-on		$2,000		

Fulfillment to be completed in: ❑ Corporate ❑ London ❑ Virginia ❑ France ❑ Other _____

• White - Contract • Green - Fulfillment • Yellow - Invoice • Pink - Originator • Goldenrod - Sales Manager

M&S180 11/90

INPUT

INPUT

Atrium at Glenpointe, 400 Frank W. Burr Blvd., Teaneck, NJ 07666 Tel. (201) 801-0050
Fax (201) 801-0441

June 11, 1993

Brian Pawlus
Andersen Consulting

Via Fax

Dear Brian:

This will confirm our telephone conversation yesterday.

We will interview companies from the list you sent to us of situations where Andersen lost (or believed it lost) due to the UNIX factor. This group will be analyzed separately and compared to other companies in our report.

There will be an additional fee for this of $4,000, as we discussed.

The faxed list looks good overall, but as you said in your transmittal, any further information on names and locations will improve our contact rate.

I don't think that adding these will affect delivery by July 12, but will keep you informed.

Sincerely,

Tom O'Flaherty
Vice President

PROJECT WORK STATEMENT

TITLE Market for UMX Mfg Svc

CLIENT Andersen

CONTRACT: ATTACHED X TO FOLLOW ____ LETTER ____ VERBAL X

PROJECT LEADER TAR PROJECT CODE YA6

DATE STARTED May 24 PLANNED COMPLETION DATE July 31

LEVEL OF EFFORT (Professional Man Days) 14

TOTAL CONTRACT VALUE: $ or £ $23,000

REVENUE DISTRIBUTION (% or $) INPUT US 10 INPUT LTD ____

REIMBURSABLE EXPENSES: NO ____

YES X

EXP. BUDGET 3,000 TO COVER: TRAV: X

TELE: X

RPT. PREP.: ____

OTHER: ____

BILLING SCHEDULE DESCRIPTION Regular

PROJECT DESCRIPTION 125 US/Canadian interviews in mfg sector to see plans/acceptability of UMX platform

INDICATE TYPE OF WORK: REPORT X PRESENTATION X

THANK YOU PACKAGE: YES X NO ____

ACCOUNTING USE ONLY: ENTERED ON CURRENT PROJECT LIST ____

DISTRIBUTI

CONTRACT FILE

LIBRARY FILE

NEW JERSEY

INPUT LTD.

Originator

SHEILA (Y&Z on

BINDER COPY

Date Typed

PROJECT SCHEDULE

Week And Maybe

Activity	Name	Act. Days	Factor	ESD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Q dev				1	1													
Int ~~150~~ 125x30			9K			—	—	—										
An	JP			2				1	1									
Rpt/Pres prep	TCF			3				2	3/1	2								
Pres				1.							1							
TOTAL PLAN SR.																		
TOTAL PLAN RA																		
TOTAL PLAN ESDs				9														

~~8~~ ~~15~~ 6 14.4 + 9 = (23.4)

Proj. Code: _____ Proj. Name: _____ Prepared by: _____

Proj. Manager: _____ Date: _____

Report

DETERMINING THE RECEPTIVITY OF UNIX SOFTWARE IN THE DISCRETE MANUFACTURING SECTOR IN THE U.S/CANADA MARKET

Submitted to

ANDERSEN CONSULTING

June 12, 1993

Submitted by

INPUT

The Atrium at Glenpointe
400 Frank W. Burr Boulevard
Teaneck, New Jersey 07666

201-801-0050
Fax: 201-801-0441

I. BACKGROUND AND METHODOLOGY

A. Background

Andersen Consulting is considering porting MACPAC for the AS/400 to the HP/Informix platform. Andersen wishes to understand buyer reception to such a product offering. INPUT was commissioned to conduct market research in the U.S./Canada market to gauge likely buyer receptivity. The proposed research consisted of 125 structured interviews with discrete manufacturing firms in the U.S. and Canada.

B. Methodology

INPUT prepared a draft questionnaire which was reviewed by Andersen. (A copy of the questionnaire is in Appendix A.)

Respondents were qualified and categorized in the following ways:

- According to Andersen's prioritization of manufacturing subsectors. (See Appendix B, which shows SIC codes classified into "high". "medium" and "low".)
- By company or operating unit size.
- Whether a manufacturing application was planned to be replaced in the next three years. [If no replacement was planned, the company was excluded from the rest of the study.]
- Whether packaged software would be considered by those planning a replacement. [If packaged software would not be considered, then the company would be excluded from the study.]
- Respondents should be part of the recommendation/approval process for selecting new applications.

As it turned out almost 90% of all companies contacted were planning to replace at least one manufacturing-related application and would be considering packaged software (Exhibit I-1). INPUT considers this to be a significant finding and shows an acceleration in replacement compared to studies conducted in 1992. After these exclusions, the remaining sample produced 133 completed interviews.

Respondents were furthered qualified by their involvement in manufacturing applications. As shown in Exhibit I-2, respondents were heavily involved in the recommendation and approval process. Respondents were classified by both their title level and their organizational area (Exhibit I-3).

- About half the respondents were from the IS area, most of them in executive positions.
- Applications specialists, either in a functional area or in an applications, unit accounted for the remainder of the interviewees.
- This mix is consistent with other INPUT studies which have shown a steady migration, or sharing, or responsibilities between the traditional IS unit, end user areas and new organizational structures which address application systems needs.

Respondents were quite forthcoming and frank and answered questions as completely as they could.

The questionnaire was a mixture of rating questions and open-ended questions. Where there were clusters of answers in an open-ended question, these were grouped and classified. In other cases, where the number of responses were too small or responses were quite scattered, extracts of the actual replies are presented.

The data which follows shows results for the entire sample of respondents. The sample was large enough so that the following sub-samples were also analyzed.

- The effects of the size of company on these results was assessed by analyzing the 30 companies in the sample whose revenues were over $500 million.
- The effects of Andersen priority segments was analyzed by analyzing 63 companies in Andersen's "high" group.

In neither case was the data appreciably different from the sample as a whole. Given the focus of this study, INPUT finds this lack of difference reasonable.

II. APPLICATIONS REPLACEMENT AND MARKET SIZE

A. Replacement Plans

Near term replacement plans are a critical factor for Andersen's plans. Exhibit II-1 shows a high degree of replacement planned in all major areas. Financial applications show the highest replacement rate.

Respondents were asked to assign probabilities to replacement.

- Probability of replacement is quite high.
- These percentages exclude those who could not give a probability; therefore, the replacement rates may even be conservative.

These replacement plans are driven by a variety of factors, many of them mutually reinforcing. Exhibit II-2 has classified these reasons. INPUT is struck by the urgency of many of these motivating factors.

A very large percent of respondents are looking to use packaged software as the replacement (Exhibit II-3).

- Virtually all firms are considering packaged software; the figures in Exhibit II-3 are for firms that give packaged software use a probability of 75% or more.
- Almost half the firms surveyed are in fact evaluating one or more packages now (Exhibit II-4).
- Exhibit II-5 is a list of applications packages which firms were willing or able to cite as currently under evaluation. Note the wide array of vendors; no vendor appears to have a lock on this market.

Exhibit II-6 shows the hardware/software operating environments being considered for new applications (in many cases there is more than one under consideration).

- The UNIX environment is being considered more than any other single environment.
- The proprietary environments as a group are being looked at by about half the firms interviewed.
- Note that the AS/400 was the second most frequently cited environment.
- INPUT believes that the proprietary platforms are more likely to be rejected in the evaluation process.
- On the other hand, Windows NT and its successors are likely to be much more of a factor in the medium term, i.e., further out than three years.

Overall, INPUT believes that UNIX-based applications will prove to be quite acceptable in this market.

Exhibit II-7 shows INPUT's current forecast for packaged applications software in discrete manufacturing: A current market of over $2 billion, growing to twice that in five years.

- These figures (produced in 1992) may in fact underestimate growth somewhat, given changes now going on in this market.
- The midrange/minicomputer segment is beginning to blend into the Workstation/PC segment. For the purposes of this project, INPUT would combine these two categories for sizing purposes.

Overall, INPUT believes the UNIX proportion of the overall market to be in the 40-50% range over the next three years.

- Further out, much will depend on both the real and apparent success of NT (and OS/2, to a degree).
- The result is a window of opportunity in the short term and the potential for greatly increased competition in the longer term. Therefore, INPUT believes that early entry by Andersen into the UNIX market will be a key success factor.

III. PACKAGE SELECTION CRITERIA

Functionality and ease of use are important (or very important) to virtually every company (Exhibit III-1).

- Vendor reputation and installation support are important to about three-quarters of companies (global presence, on the other hand is not very important). Cost is of medium importance.
- Technology factors (client/server and portability) are the least important factors on the list.

The survey looked at these issues another way, by asking respondents what advice they would give to vendors on what should be included in the next generation of software. These results are categorized in Exhibit III-2.

- The general category of a better technical environment and associated efficiency and performance was cited by one-third of respondents. Details are shown in Exhibit III-3.
- Improved user friendliness was cited by a quarter of respondents.
- Improved functionality was also cited by a quarter of respondents. However, there was no particular agreement on which functions were important (details in Exhibit III-4).
- The fact that functional needs can vary so much was the reason, INPUT believes, for 20% of respondents citing the need for more flexible software.

The actual software package selection process is almost always a joint effort in the companies interviewed, with representatives from both IS and the functional area(s) involved. In many organizations, the functional unit will have more influence, but this is a very organization-specific factor.

IV. ASSESSMENTS OF OPERATING ENVIRONMENTS

A. General Assessments of Operating Environments

Respondents were asked to rate five of the principal operating environments (Exhibit IV-1).

- UNIX received the highest ratings, OS/2 and MVS the lowest.
- The low ratings are quite low for this kind of survey; the UNIX ratings are acceptable, but do not indicate an impregnable position.
- For the most part, there was little difference between ratings for 1994 and 1996, except for Windows NT. There appears to be a predisposition to see good things in the future for NT. If NT's performance lives up to its promise, then NT could become a real competitor.

In addition to the single point ratings above, respondents were also asked to give what they saw as the strengths and weaknesses of these operating environments. The comments for each operating environment are in Exhibits IV-2 through IV-11.

- These strengths and weaknesses, while covering a lot of ground, do not contain any real surprises.
- Exhibit IV-12 provides an unweighted summary of the points made.
- Again, INPUT draws attention to Windows NT: The main weakness is that it is new.

Exhibit IV-13 provides an "index" of the strengths and weaknesses for each environment by counting the number of items mentioned as a strength or weakness and dividing by the total number of respondents; this takes into account of multiple reasons given by some respondents.

- This indicates that even UNIX is seen to have almost as many weaknesses as strengths.

B. Suitability of Selected UNIX Platforms for Running Manufacturing Applications

In the preceding section, general environments were evaluated. Respondents were also asked about the suitability of specific UNIX hardware and DBMS environments for running manufacturing applications.

- HP was rated as the most suitable hardware platform (Exhibit IV-14). Sun and IBM were reasonably close; DEC's Alpha was further behind, probably because of its recent release.
- DBMS products were clustered fairly tightly, with Informix perhaps behind the others (Exhibit IV-15).

Respondents are asked to cite particular hardware/DBMS combinations that they "believed would be particularly attractive". Exhibit IV-16 lays out these volunteered responses.

- In some case multiple combinations were provided.
- In other cases, respondents would name only a hardware or only a DBMS platform.
- In hardware, HP and IBM were cited most overall.
- Oracle and Sybase were the most cited among the DBMSs.
- No particular combinations were dominant; some combinations were not cited at all.
- The Informix/HP pair was only cited twice. Informix was among the DBMSs cited least. [Note: This question was asked after and as a follow on to the rating question, so Informix was positioned as well as Oracle, Progress of Sybase for recall.]

It is INPUT's belief that the hardware part of the hardware/DBMS pairing will be more important in the marketplace. Consequently, HP's higher rating is more important than Informix's lower rating.

V. UNIX PORTING ISSUES

One of the sections of the interview focussed on respondents' attitudes toward re-engineering/porting of an application to UNIX that was originally written for another operating system. There were three related sets of questions asked:

- The general advantages and disadvantages in going from a non-UNIX to a UNIX environment.
- The specific advantages and disadvantages in going from the AS/400 to UNIX.
- The advantages and disadvantages in going from MS-DOS to UNIX [This was a "control" question.]

Exhibits V-1 to V-6 provide the detail on the comments made for advantages and disadvantages.

- Overall, the advantages seen were an increased probability that an application would work and contain the necessary functions; also, that time and expense would be reduced.
- Disadvantages include a general doubt that such conversions can be effective along with the associated questions as to
  - Whether all of the original functionality will be carried over onto the new platform.
  - Whether full advantage will be taken of UNIX's capabilities.

Relatively fewer advantages were seen and relatively more doubts were expressed as specific originating platforms (AS/400 and MS-DOS) were examined.

- Less, of course, was known about the specifics of MS-DOS or AS/400 porting.
- There appeared to be an underlying belief that dissimilarities in architecture would cause problems.

INPUT does not believe that these findings are necessarily causes for alarm. However, they should be taken into account when preparing the product for market, for example,

- Certain technical objections can be dealt with in advance (e.g., feature transference and UNIX efficiency).
- It might prove advantageous, for example, to point to the past use of the functional components without stressing the platform origins.
- Further research on the reaction of initial prospects may also be in order.

Exhibit I-1

Interview Qualification Process

Category	Number of Interviews	%
No application replacement planned in next three years	4	3
Replacement(s) planned, but packaged software won't be considered	12	8
Target Respondent: Considering package(s) for replacement	133	89
		100

Exhibit I-2

Respondents' Areas of Responsibility

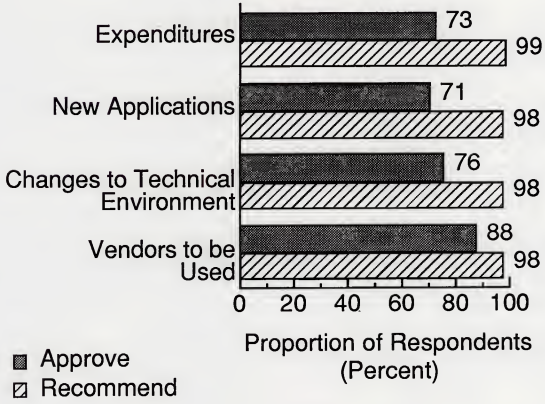


Exhibit I-3

Respondent Titles (Classified)

	Organizational Area			
Title/Level	**General IS**	**Appli-cations**	**Functional User**	**Total**
Unit Head	57	0	12	69
Middle Managers	10	32	9	51
Analysts/ Specialists	0	13	0	13
TOTAL	67	45	21	133

Exhibit II-1

Percent of Companies Planning to Replace Selected Applications in Next Three Years

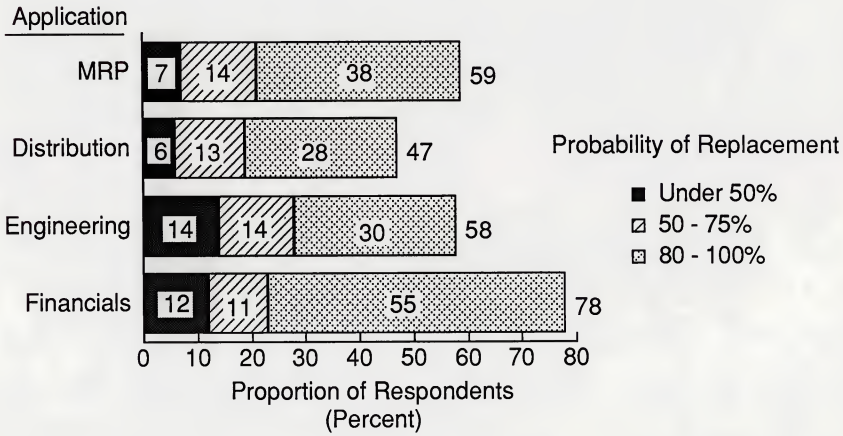


Exhibit II-2

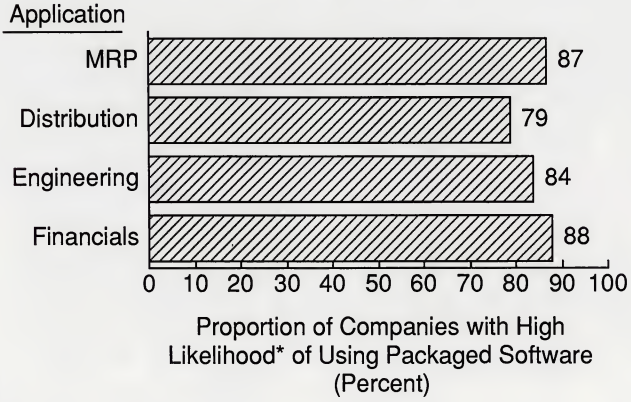
Reasons for Replacement

Percent of Companies Citing	Reasons
20-29%	• Obsolete software; need software upgrade • Improve technical environment • Improve functionality
10-19%	• Effects of changes to underlying business process • Downsizing/client-server • Reduce costs
Under 10%	• Move to open systems • Growth in underlying business • Other

Note: Open-ended answers were classified into the above categories.

Exhibit II-3

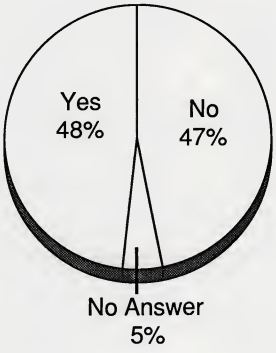
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.

Exhibit II-4

Currently Evaluating Manufacturing Software Package(s)



Number of Respondents = 133

Exhibit II-5

Specific Manufacturing-Related Software Packages Being Evaluated

(If named by more than one company, number of companies shown in parentheses)

Amax
Andersen (2)
ASK
Autocad
Avalon (5)
Cadkey
Cim300
Front Line
FSA
Global
J.D. Edwards
Lawson
Macola
Manman (3)
Mapics (2)
Marketrieve
Micromax
Oracle (3)
Pansophic
Platinum
Prism
QAD (3)
SAP (2)
Sherpa
SSA
Synapse
Unigraphics
XES (Xerox)

Exhibit II-6

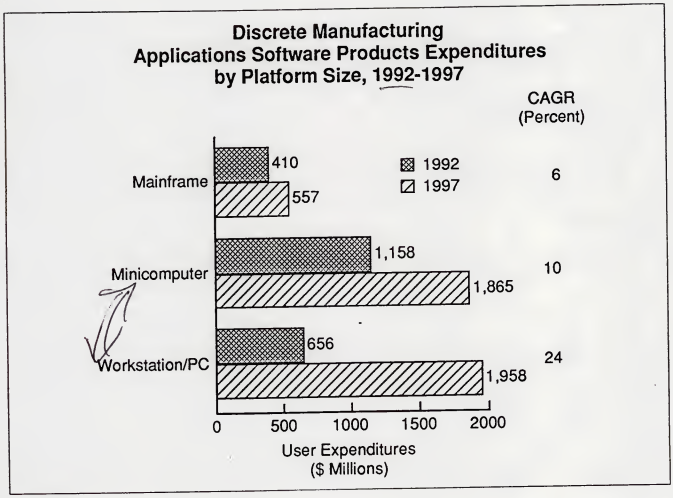
Hardware/Operating Environments Now Being Considered for New Applications

Environments	Percent of Companies *
Proprietary Platforms	54
• MVS 16%	
• AS/400 20%	
• VAX 13%	
• Other 9%	
UNIX	38
• RS6000 8%	
• HP 7%	
• Sun 4%	
• DEC **	
• Not identified 20%	
Intel	19
• OS/2, Windows 5%	
• DOS 14%	
Other	5
• Windows NT 2%	
• Other 2%	
Not specified	10

* Note: Totals more than 100% due to multiple evaluations.

** Less than 1%

Exhibit II-7

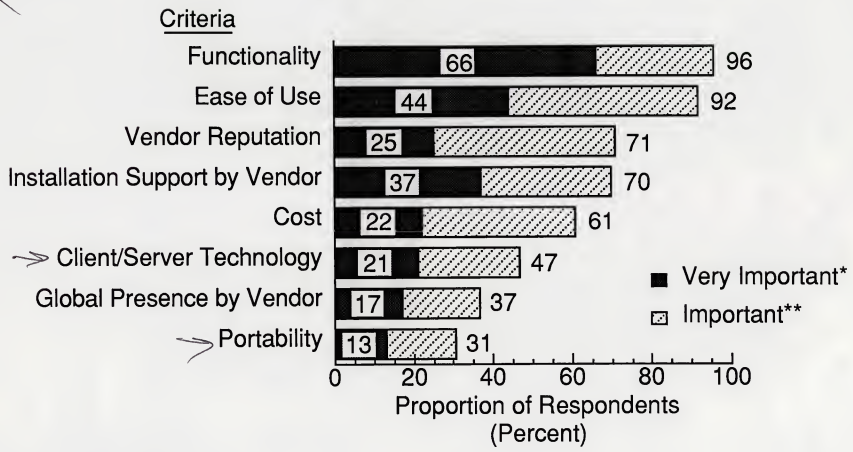


near term
UNIX 30-40%
Window of opp

Exhibit III-1

(Menu)

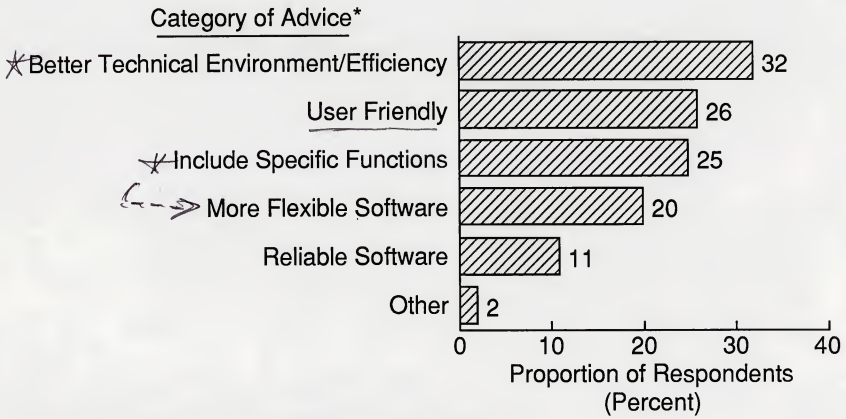
Manufacturing Package Selection Criteria



* 5 on a scale of 1 to 5
** 4 or 5 on a scale of 1 to 5

Exhibit III-2

Customer Advice on What the Next Generation of Manufacturing Software Should Include



* Open-ended responses were classified into these categories.
Note: Totals more than 100% due to multiple responses.

Exhibit III-3

Samples of Advice:
Technical Improvements, Efficiency

- Client/server technology
- Productivity
- Object oriented
- More capacity, less cost
- Cheaper
- Client/server
- Capabilities
- More portability
- Open and robust opportunity system
- Networking
- Portability
- Operating systems to be burned in machine
- UNIX platform
- Reduce cost
- Easy interfacing with other platforms
- Ability to integrate PCs with mainframe
- Cost effective
- Real time paperless environment
- Need software written for multi-platforms
- Full motion video
- CD rom
- Voice technology
- Logical data base that exists multiple platforms
- Networking management tools
- Handle large transaction volume
- Scalability
- Object oriented data base
- Portability
- Standardize protocols between systems
- Reduce the complexity of Lan administration
- Portability
- Affordability
- Strong clean client server
- Modular replacement
- Portability of applications

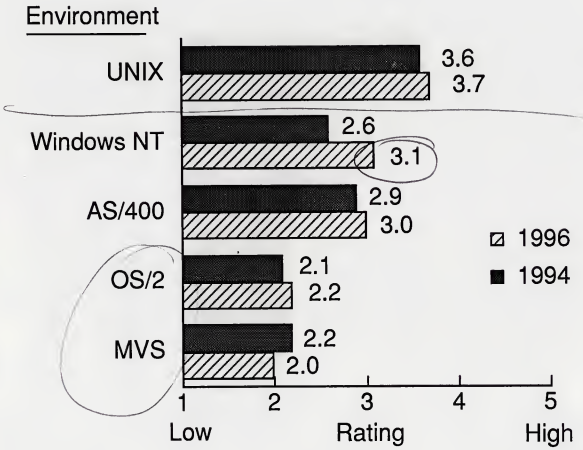
Exhibit III-4

Samples of Advice: Specific Functionality

- Electronic transfer
- EDI
- International
- Real time what if capabilities
- Access to user base
- JIT
- Automate more processes
- Ad hoc reporting
- Full function MRP II
- Engineering history prototype
- Know the industry and its needs
- A distributive and centralized planning cycle
- Handle batch manufacturing and continuous flow
- Support financial applications
- Information extaction
- Work in process interface
- Bar code data collection
- Fax interfacing
- Executive information system
- Graphic capabilities
- More industry specialization
- Shop floor control
- Order tracking
- More resource planning
- Package that can do everything

Exhibit IV-1

Ratings of Operating Environments: 1994 & 1996



Open-ended
strengths
weaknesses
INPUT

Exhibit IV-2

UNIX Strengths: Respondent Comments

Summary on ES IV.12

- Portable
- Easy to use
- AIX Solution
- Already in use
- Interface with legacy
- Portability
- Cost of ownership
- Operating system for high end applications
- Strong performer
- Open connectivity
- Multi-tasking abilities
- Will be very popular
- Good system
- Use for engineering
- Multi-tasking
- More and more systems are running on it
- Very strong and flexible
- Open system
- Client/server environment
- Operating systems management tool
- Open systems
- Multi-user capability
- Very powerful
- Very strong open system
- Flexibility
- Has excellent points
- Compatible with right packages
- Hardware and support environment
- Best chance
- Selected by parent company
- Hardware is inexpensive
- Very functional
- Suitability and openness
- Next alternative
- Portability
- Definitely part of future
- No-problems
- Portability
- Client/server
- Very good
- Strong
- Likes it
- Everyone is pursuing this

Exhibit IV-2 (Cont.)

- Inexpensive
- Good when installed
- Very satisfactory
- Flexibility and data manipulation
- Handles all operations
- Platform
- Portability
- Very suitable for job
- About to install
- Meets all needs for software wide area network development
- Language capabilities
- Moving in that direction
- PC network
- Overall acceptance in open system
- New technology
- Availability of a functioning open system
- Distributed environment
- Standard operation system
- Best fit
- Standards
- Strong
- Reliable
- Standard operating system
- Open
- Good hardware
- Flexibility
- Worthwhile for staring out
- Openness
- Ability to run multi platforms
- Multi-tasking
- Multi-threading
- Portability
- Portability
- Performance
- Open system
- Ties in with engineering
- Multi platform usage
- Becoming a mainstream player
- Multi platform
- Multi processing
- Portability
- Good for RS6000 system
- Seems to be gaining more support and broader user database
- Multi platform engineering
- Engineering application
- Efficient
- Almost standard
- Multiple platforms

Exhibit IV-3

UNIX Weaknesses

- Functionality and reliability
- Too large and costly
- Not easy to use for end user
- DOS better for smaller software companies
- New operating system
- Not developed enough
- New systems lacking standards
- Not mature yet
- Too open
- Ease of use
- Doesn't match software
- Not as easy as it looks
- Not mature
- Not as user friendly with windows
- Very difficult
- Failure to standardize
- Interfacing
- Not as strong as they make it out to be
- Incomplete support
- Complexity
- Security
- Limited selection and features support
- More complicated
- Too much learning curve
- Complex
- Not much exposure
- No commercial application value
- Complex
- Not user friendly
- Expense to re-engineer
- Complexity
- New to company
- Development not as quick as PC technology
- Not so stable
- Too complex
- Not as open as people think
- Too open
- Not easy to use
- Somewhat archaic

Exhibit IV-3 (Cont.)

- Not user friendly
- Not flexible
- Robustness
- Software not flexible
- Cost
- Security
- Ease of use
- Too new
- Unsettled
- Cryptic
- Large operating system
- Retraining required
- System language
- Slow in computational ability
- Not user friendly
- Too small
- Getting away from it
- Not standard and complex
- Lack of ability to share data
- Not as much support
- Proprietary
- No need for business side
- No single UNIX

Exhibit IV-4

AS/400 Strengths

- Very stable
- Lot of software written for it
- Good flexibility
- Recently installed and works well
- Easy to work with
- IBM name
- Flexibility
- Conversion
- Optimal solution
- Has good UNIX Capability
- Would do fine
- Ease of use
- Installed
- Very mature
- Ease of use
- Reliable
- Good
- Allows us to be distributed
- Good for communications
- Backup and recovery
- Extremely good
- Reliable
- Database
- Ease of integration to current manufacturing system
- Easy to use
- Current platforms
- Good rational database
- Performance
- Cost
- Interfacing data
- Some sites in Europe use this
- Used and have had good results
- Users like it
- Relational database
- Programmer productivity
- Good platform
- Fine
- Solid and reliable

Exhibit IV-4 (Cont.)

- Very easy to use
- Good platform
- Good reputation
- Platform is IBM
- Using it
- Operating systems
- Good choice
- User based
- A logical choice
- Flexible
- Already run on
- Excellent development environment
- Good mid-range
- Good use for them
- Good system
- Efficient
- Secure
- Multi-porting
- Software packages available
- Proven performance
- Have used for over ten years

Exhibit IV-5

AS/400 Weaknesses

- IBM proprietary and restrictive
- Too proprietary
- Too much equipment
- Communications
- Proprietary box
- Expensive
- Too expensive
- Dog
- Too much hardware
- Cost of operating system
- Cost of software
- Not standard system
- Not considering
- Memory problem
- Poor solution
- Too proprietary
- Not very much use
- Propriety system not as open as others
- Cost of hardware
- Proprietary
- It is not what IBM says
- Proprietary
- Becoming outdated
- Limited selection of full featured system
- Weak
- Expense to re-engineer
- Expense
- Proprietary
- Proprietary database
- Not as functionally quick
- Too costly
- Not easy for transition
- Not user friendly
- Not a good fit for company
- Cost
- Not useful with UNIX
- Unfamiliar
- MIPS
- Proprietary
- New equipment too expensive
- Not worth building a new infrastructure
- Not included in strategic planning
- Not portable

Exhibit IV-6

OS/2 Strengths

- Good operating system
- Solid
- Good system
- Seems to be reliable
- More functional and stronger products
- Good for PCs
- Portability
- Good product
- Used at a few locations
- A good system
- Compatibility
- High functionality
- Data sharing/collection
- Ease of use
- Cost
- Client/server
- Good results
- Better than Windows NT
- Portability
- Multi-tasking capabilities
- Looking into this
- IBM
- Multi-tasking
- Powerful PCs
- Good hardware
- Reputation
- Address capability
- Well known
- Compatible with DOS
- Multi-processing
- Client/server
- Works on small platforms

Exhibit IV-7

OS/2 Weaknesses

- IBM proprietary and restrictive
- Too proprietary
- Nothing there for them
- Too new
- Bugs with installation and support of peripherals
- Cost
- Take too much to run on PC
- Windows are capturing most of market
- Not enough software yet
- Dog
- Don't have hardware
- No interest
- Diminishing
- Not robust enough
- Not an IBM shop
- Needs more memory
- Not enough packages
- Not much use
- Not a big player
- Support
- Limited selection and features support
- Too much learning curve
- Too proprietary
- Weak
- Dying system
- Expense to re-engineer
- Proprietary
- Memory hog
- Not well known and not trusted
- Software not flexible
- Market acceptance
- Not as good as windows
- Unfamiliar
- Cost
- Consumption of memory
- Don't care for it
- Too little presence in market
- Not mature yet
- Not multi-processing environment they anted to use
- Vendor support
- Proprietary software
- Won't use again because of lack of database
- No application
- Doesn't work on large platforms

Exhibit IV-8

Windows NT Strengths

- Network for users
- Great option for high power area
- Suitable for single station use
- 32 bit processing operating system
- Hopes for future PC capabilities
- Multi-task feature
- Much larger sphere of software
- Will certainly consider
- Cute
- Ascending
- Looking at right now
- Good PC environment
- Good chance
- Microsoft name
- Plans to use
- Cost
- Client/server
- Good token ring
- Hope to make use in network and client/server
- Currently evaluating
- Dependability
- Ease of use
- Probably best option
- Provides ease of use
- Strong
- Good but new
- Low cost
- Being looked at
- Looks to be a good thing
- Represents a strong case
- Do well to meet end users and client/server requirements
- May go with this
- Microsoft
- Powerful
- Microsoft
- When it is less new it will be good
- Works well with company engineering systems
- Distribution capabilities
- Easy to use
- Speed
- Vendor reputation
- Openness
- Interfacing
- Multifaceted
- Multi-processing
- Client/server
- Work on wide range of platforms

Exhibit IV-9

Windows NT Weaknesses

- Not available
- Not needed
- Not stable enough to use as client/server
- Too new
- Untried
- Too many operators
- Too recent
- Not an issue
- Too new
- Too much hardware
- Yet to be proven
- Too new
- Doesn't see it being a useful product
- Not available
- Not proven yet
- Not enough information
- Waiting to see maturity
- Don't know much yet
- No plans for a year
- Takes too much administration
- No PC applications would apply
- Don't know to much about it yet
- Too soon to comment on
- Too new to say
- Not transaction driven
- Unavailable
- Too early to say
- New on market
- Too new
- Not out yet
- Too new
- Not enough people know about it
- Too new
- Requires a lot of hardware
- Too new
- Still unproven
- Don't know
- Expensive and too large for PC environment
- Not proven yet
- No applications
- Untested

Exhibit IV-10

MVS Strengths

- Handles applications without complaints
- Very reliable
- Good
- Reliability
- Data security
- Multi-user
- High functionality
- Large selection
- Support
- Does the job
- Fine
- Very satisfied
- ESA on host mainframe
- High transaction rate
- Great
- Mainframe
- File server
- Greater selection
- Good
- Mainframe
- Stable operating environment
- One point of support
- Proven
- Versatility
- Strong base security
- Handles heavy loads

Exhibit IV-11

MVS Weaknesses

- Complex and too costly
- Dying system
- Proprietary
- Not in step with company movement
- Not user friendly
- Too big and too expensive
- Would never consider using
- Too expensive
- Too old
- Too expensive
- Diminishing
- Wouldn't consider
- Antiquated
- Wouldn't consider M/F
- Not an MVS shop
- Poor solution
- Will probably die
- Applications not written to platform
- Not flexible
- Proprietary
- Proprietary
- Cost
- Cost
- Impractical
- No use for mainframe
- No IBM mainframes wanted
- Not our strategy at this point
- Weak
- High cost
- Costly
- Difficult to maintain support
- Proprietary
- Slow development requirements
- Negative for company needs
- Too costly
- Too costly
- Not user friendly
- Very dependent on mainframe
- Too big
- Too big

Exhibit IV-11 (Cont.)

- Not good for client/server
- Too cumbersome
- Availability
- Too expensive
- Cost
- Cost
- Proprietary
- Expensive
- Mainframe is not compatible
- Overkill and not worth building a new infrastructure
- Expensive
- Limited flexibility
- Too big
- Too big for our operations
- Hardware and software are too costly
- Don't know
- Too big
- High cost

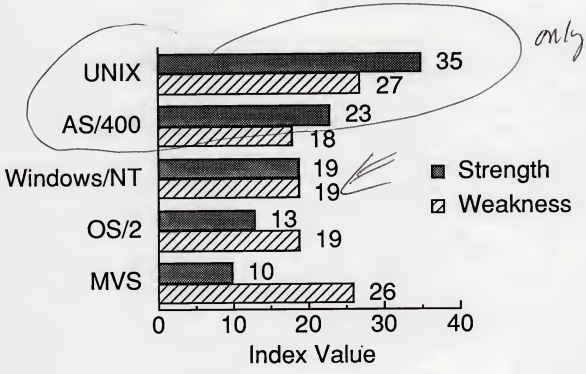
Exhibit IV-12

Operating Environment Strengths and Weaknesses: Summary

Environment	Strengths	Weaknesses
UNIX	• Portable/open • Wide use • Inexpensive hardware	• Immature • Not standard • Complexity/ease of use
AS/400	• Installed base • Ease of use • IBM • Software packages	• Proprietary • Cost
OS/2	• Technology • Portable	• Proprietary • Market acceptance
Windows NT	• Microsoft • Technology • Image	• Untried
MVS	• Reliable • Power	• Cost/size • Obsolete • Proprietary

Exhibit IV-13

Index of Strengths and Weaknesses for Operating Environments



Note: Index Value = Total mentions/number of respondents (133)

Exhibit IV-14

Suitability of Selected Hardware Products for Running Manufacturing Applications in UNIX env.

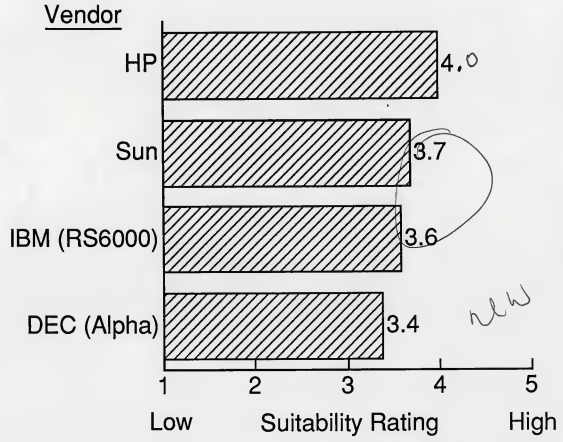


Exhibit IV-15

Suitability of Selected DBMS Products for Running Manufacturing Applications

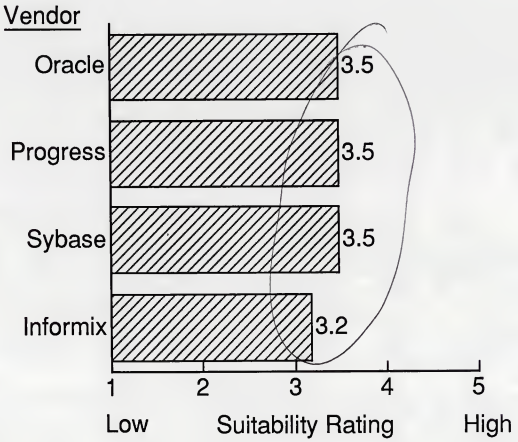


Exhibit IV-16

volunteered

UNIX Hardware/DBMS Cited as "Especially Attractive"

(Matrix intersections show combinations cited.)

DBMS	DEC	HP	IBM	Sun	Other *	DBMS Only Named	Total
Informix		2	2	2			6
Oracle	4	6	5	5	(a) 2	4	26
Progress		2	2	1		4	9
Sybase	3	7	5	4		4	23
Ingres*	2		2			2	6
Supra*						2	2
HW only named	4	8	7	4	(b) 3	-	26
TOTAL	13	25	23	16	5	16	98

* Products volunteered
(a) = OS/2, Sequent
(b) = Data General, Tandem, Incube

See Text

Exhibit V-1

Advantages of Re-engineering an Application to Run Under UNIX

- Good idea
- Scale ability
- Portability
- Networking
- Runs on more current and less costly hardware
- More diverse functions for smaller networks
- Friendly environment for client/server better platforms to be on
- If mature product needs viable applications
- operation system
- Better price
- If very unique application
- Would like to look into
- Multi-user environment
- Easy to use
- If supports UNIX and DOS
- Portability
- Business environments
- Looking at UNIX
- A more open system
- High compatibility enhancement
- Programmer productivity
- Good for some applications
- Way to leapfrog to gain functions of environment
- To use
- Speed of porting
- Portability to other hardware once under UNIX
- Open systems
- Gain advantage of open system multi tasking
- Networking
- Open systems
- Scalablity
- Cheaper hardware
- Portability
- Portability
- Needs a solid cost analysis study
- Re-engineering to a versatile open environment
- Very versatile and users like it
- More approaches

Exhibit V-1 (Cont.)

- Open system
- Better portability
- System maturity
- Downsizing
- Less expensive to operate
- Good for database
- Improves documentation
- Improve cost/time factor to profit from new environment
- Provides direct interface runs with other system and applications in INIX environment
- Users familiar with UNIX platform
- Portability
- Reduced cost
- Run multiple sets of environments
- For a particular need or function
- Opportunity to take advantage of new technology
- Portability
- Cost effective
- Portability and independent Hardware
- Make everything more flexible
- Could size hardware to fit needs better
- Transportability and ability to interface
- Programs easily portable to run on many different platforms
- Can do what otherwise couldn't be developed
- Stay with leading tech
- Multi-platform availability
- Keeping software investment
- Flexibility
- Easy to use
- Lower cost
- Will run on almost any platform
- Multi platform capability
- Flexibility after porting application
- More platforms available

Exhibit V-2

Disadvantages of Re-engineering an Application to Run Under UNIX

- Will application be fully functional
- Expensive
- Impractical
- No great benefit
- Not stable
- No advantage
- Complexities
- Too big and too costly
- Would not Accept
- No advantage
- No advantage
- But if the mainframe is not in use the rewriting would not be cost effective
- Many
- Not user friendly
- No advantage
- Need to build software to meet particular needs
- Cost and burden of other system requirements
- No advantage
- Hardware and software issues
- Too much trouble to do it
- Commitment is to UNIX solutions
- Cost
- Problems with rewrites
- Interfacing issues
- Dead issues windows NT would replace it
- No advantage
- Cost
- Conversion
- Cost
- Need to re-engineer
- Wants to see more data on compatibility
- Cost
- Doesn't give full support
- Age of application converted
- Cost to rewrite
- Too Costly
- Learning curve
- Vendor reliability and support
- people and procedure training

Exhibit V-2 (Cont.)

- Training of re-engineering
- Fully renewed system better
- No advantage
- A lot of work
- Cost to re-engineer
- Re-engineering
- New and unproven activity
- Interface activities
- Needs re-engineering
- Would take time to perfect
- Work and effort needed
- Relatively new technology don't have networking
- Too much time and effort in setup
- Too complex very difficult to do conversions
- Will it support business functions
- Cost and complexity
- No advantages
- The effort to do it
- Cost
- Time consumption
- Time to do it
- Cost or re-engineering
- Takes years of rewriting
- Probably not worth it
- Data interfaces connectivity and security
- Cost
- Return on investment low lack of stability
- Might not take full advantage of operating systems
- Too costly
- Cost
- Work development cost
- No advantage
- Calls for a lot of modification
- Expensive and time consuming
- No advantage
- Cost
- Won't happen
- Not easily portable
- May lose some of the design functionality of UNIX
- Cost to re-engineer

Exhibit V-3

Advantages in Porting from AS/400 to UNIX

- Portability in operating environment
- Open system
- Wider audience for applications
- Portability
- Commercial database access
- Cost of ownership
- Too early to say
- If cost is reduced
- Open systems
- Portability
- AS/400 is a good foundation
- Can run a good software package
- Multi-user
- Multi-task
- Portability and cost
- CAD and other engineering functions
- Flexibility
- All users are familiar with AS/400
- Downsizing or cost
- Good to standardize the UNIX environment
- Advantage for a large mainframe
- AS/400 is proprietary, good to make to open systems
- Take advantage of UNIX system
- UNIX already in use
- Cost effective
- UNIX has wider market
- Greater client connectivity
- Multi platform availability
- Want to do it
- Good for some applications
- UNIX more portable

Exhibit V-4

Disadvantages in Porting from AS/400 to UNIX

- Expense
- Loss of power
- No great benefit
- Not stable
- Cost
- No one-stop shopping
- Wouldn't do it
- No advantage
- Change in platform
- Too early to say
- No advantage
- Converting
- No advantage
- Isn't upgradable
- No advantage
- Commitment is to all UNIX solutions
- Have to change equipment
- No advantage
- No need foreseen
- Cost
- Not doing it
- UNIX not strategic
- No advantage
- Complexity
- Expense
- Cost to convert and train
- Cost environment
- Not sure of advantage
- No advantage
- Need to re-engineer
- Need for more powerful hardware
- Integration and interfacing
- Wouldn't consider it
- No comment
- No advantage
- So architecturally different
- Locked into IBM
- No advantage
- Rewriting
- Would not consider such a package
- A lot to modify
- Don't know enough
- No advantage
- No advantage
- Data loss and access
- Security
- Won't consider
- Not easy to port
- Not user friendly

Exhibit V-5

Advantages in Porting from MS-DOS to UNIX

- Multi user capability
- Better operating system
- Scalability
- Porting to a more robust operating system
- Portability
- Can work well
- Move from a PC based system to multiple users
- Emulation going on multi platform issue
- A positive return is expected
- Multi user environment
- Easy to use
- Gain a great deal of functionality
- Multi-tasking
- Efficiency and power
- Good if system is moving to client/server environment
- Don't care as long as it works
- Wide area network
- Multi user less expensive
- Open system
- Powerful workstations
- Servers more robust
- Open system
- Scalability
- Multi-tasking
- Advantage if running MS-DOS
- The system is DOS-based and is being downsized to client/server
- Have an MS-DOS base
- Networking capabilities
- Could be more sophisticated
- To standardize the UNIX environment
- Growth
- Good for single user
- Multi-user
- More functional
- More of a non-operational client/server environment
- Shouldn't be difficult
- Can go to different platforms
- Cost effective
- Multi-tasking

Exhibit V-5 (Cont.)

- Speed
- Improved performance
- Bigger memory and power
- Take into multi-user
- Multi-tasking universe
- Multi-platform availability
- Proven; tested; don't have to retrain people
- Better multi-processing
- Multi-tasking
- UNIX has a greater memory and speed
- Multi-user
- Multi-tasking

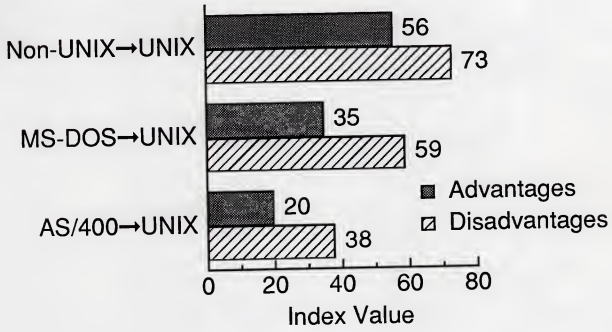
Exhibit V-6

Disadvantages in Porting from MS-DOS to UNIX

- No real advantage
- No great benefit
- Not stable
- Price
- More resource management
- Wouldn't do
- Cost
- Not suitable or cost effective for mini systems
- Many
- Converting
- No advantage
- Time
- No advantage
- No advantage
- Hardware platforms have the power
- Not sure this would go that way
- No advantage
- Commitment is to UNIX solutions
- Cost
- None
- Complexity
- No advantage
- No advantage
- Operating cost should be less
- Investment in UNIX must be justified
- No thoughts about changing MS-DOS
- No plans to move for three years
- Impractical and costly
- DOS will be around for a while
- No advantage
- Not appropriate
- Complexity of UNIX over DOS
- Need for new support
- Increased cost to run under UNIX
- Cost
- Cost

Exhibit V-7

Index of Advantages & Disadvantages of Application Porting



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